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EDITORIAL.

Padi Research in Malaya.

In accordance with established custom we devote the December number of the Journal exclusively to an account of the selection and varietal experiments and of the manurial and cultural experiments on padi which have been carried out by the Department of Agriculture during the season 1938-39. This account possibly possesses an enhanced interest at the present time in view of the necessity for increasing the local padi crop, since there are only three broad methods of producing this desirable result. These are, respectively, to increase the area under padi and where possible to improve or provide drainage and irrigation services, and to improve the planting material and cultural operations generally. A combination of these broad methods will of course produce the best results, and Malaya's padi policy has for some years past developed the application of this combination.

The chief aim of the experiments described in this number is, firstly, to improve the local types of planting material and secondly, to discover which cultural and manurial practices produce the best results from such material under conditions which vary in different districts. In "commercial" districts, for example, where padi is grown chiefly for sale to millers, the chief desiderata in selecting strains of padi are high average yield over the area coupled with good milling quality, for the operations of milling are greatly facilitated by uniformity in the raw product. One might instance the Krian District in Perak where Seraup 48, the strain advocated by this Department, is now extensively grown and earns a premium over other varieties at the local mills. The tendency in such districts, therefore, is to select or breed a standard high-yielding strain which can be grown successfully over wide areas.

In districts where padi is grown chiefly for home consumption, on the other hand, heavy yield and standardization frequently have to take second place to factors such as minor difficulties in connexion with water control and harvesting and individual preferences in the matter of flavour, and in such districts one is apt to find a number of different varieties in common use. Under these circumstances, therefore, Departmental policy has been to select and improve the best of the types acceptable to the local inhabitants. The first article in this number, by Mr. R. B.

Jagoe, describes the selection and varietal trials carried out on the numerous Departmental Padi Experiment and Test Stations during the season under review, and the foregoing considerations explain the large number and diversity of varieties under examination. The stage has now been reached in a few districts, however, where certain of the strains that have been under test for a number of years can be discarded, and consideration is in fact being given to the possibility of advantageously reducing the number of types under examination.

Turning now to the cultural and manurial aspects of padi cultivation, an article by Mr. R. G. H. Wilshaw describes the various experiments which have been carried out by the Department during the last two seasons. Mr. Wilshaw's conclusions from experiments conducted over the last nine years merit the closest attention. Firstly, the problem of the "bar" to increased yields—the factor or factors which operate to limit the yields of padi on most Malayan soils—is still unsolved. Every likely combination of manurial and cultural treatment likely to elucidate this problem has been tried, but without success. Mr. Wilshaw has therefore reached the conclusion that since as a general rule it is only the padi soils on the east coast of the Peninsula that exhibit definite yield response to manurial treatment there can be little value in continuing with padi manurial trials on the west coast until further research along different lines has given a clue to the nature of the "bar" factor or factors which operate on most of the west coast soils.

In conclusion, however, it may be remarked that the figure of 300 gantangs per acre, which represents the average of wet padi over the last seven years for the whole of Malaya, compares favourably with similar yield figures from surrounding countries.

Original Articles.

PADI SELECTION AND VARIETAL TRIALS 1938-1939

Compiled by
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The following is a summary of varietal trials and selection work carried out by the Field Branch of the Department of Agriculture in twelve States and Settlements in the Malay Peninsula and Borneo during the 1938-39 season.

The distribution of the Experiment and Test Stations can be seen on the accompanying map and is as follows:—

Perlis	...	2 Test Stations.
Kedah	...	Telok Chengai Experiment Station and 9 Test Stations.
Penang	...	1 Test Station.
Province Wellesley	...	2 Test Stations.
Perak	...	Titi Serong, Talang and Sungei Manik Experiment Stations and 9 Test Stations.
Selangor	...	4 Test Stations.
Negri Sembilan	...	3 Test Stations.
Malacca	...	Pulau Gadong Experiment Station and 2 Test Stations.
Pahang	...	9 Test Stations.
Johore	...	3 Test Stations.
Kelantan	...	Kota Bharu Experiment Station and 3 Test Stations.
Brunei	...	Kilanas Experiment Station and 3 Test Stations.
Labuan	...	1 Test Station.

(A total of 7 Experiment Stations and 51 Test Stations, of which 4 Test Stations have just been established, and were not used this season).

As formerly,* standard Latin Squares were generally used for varietal trials and the minimum significant difference between yields of any two strains or varieties has been estimated on a basis of Fisher's "t" test for 95 per cent. probability.

The season as a whole has been favourable for the rice crop, except in parts of Selangor, Pahang and Malacca where drought at the commencement of the season seriously handicapped the progress of cultivation and planting, and has resulted in poor yields over various portions of these three States.

* *Malayan Agricultural Journal*, Vol. XXVI, No. 12, 1938.

The primary importance of an adequate and assured supply and the control of water, including efficient drainage, is now fully realized, but can never be too greatly emphasized. Much valuable work is being done with both large and small irrigation schemes by the Drainage and Irrigation Department.

Throughout Malaya, in general, the padi season occupies the months of June to January; but June, July and August, except in Kedah and the Malacca coast, constitute a relatively dry season, and it is necessary that supplies of water in irrigation schemes should be based on the needs of the padi crop during this time.

PERLIS.

Kampong Salang Test Station.

Variety	Mean Yield per 1/120th acre in lbs.		
	Square A	Square B	Average
Siam 29 ...	24.8	24.7	24.8
Siam 76 ...	22.2	23.7	23.0
Radin China 4 ...	23.8	24.2	24.0
Mayang Ebus 80 ...	24.7	24.5	24.6
Reyong 20 ...	25.3	25.5	25.4

* S.D. = 1.2
M.S.D. = 1.1 lbs.

The soil at Kampong Salang is a light clay, and there is fairly good water control. Reyong 20 continues to give one of the best returns of crop.

Permatang Pauh Test Station.

Variety	Mean Yield per 1/120th acre in lbs.		
	Square A	Square B	Average
Siam 29 ...	16.8	19.3	18.1
Radin China 17 ...	19.5	20.8	20.2
Mayang Ebus 80 ...	20.7	20.8	20.8
Reyong 20 ...	11.3	13.0	12.2
Radin Benua ...	15.6	17.7	16.7

By inspection, Reyong 20 inferior to other varieties.
Plot yield variation was very great.

* S.D. = Standard Deviation.
M.S.D. = Minimum Significant Difference.

PADI SELECTION AND EXPERIMENT STATIONS
MALAYA (INCLUDING BRUNEI AND LABUAN)
SIAM
PERLIS
LANGKAWI IS.
X KG. SALANG
X SERIAB
PG. PAUH X
X JITRA
X LANGGAR
O TELOK CHENGAI
X SIK
X SALA KANAN
RANTAU PANJANG X
X PULAI
KEDAH
PROV. WELLESLEY
X KULIM
X BUKIT MERAH
PENANG
GENTING X
SUNGAI ACHEH
TITI SERONG O
X BERIAH
TG. PIANDANG X
X BAGAN SERAI
KUALA KURAU
X SUNGAI KEPAR
X SELINSING
X BUKIT GANTANG
O TALANG
X BRUAS
PERAK
X LAMPAM
O SUNGAI MANIK
PANCHANG BEDENA
X S HAJI DURANI
X TANJONG KARANG
SELANGOR
X KUANG
X KAJANG
X ULU KLAWANG
NEGRI SEMBILAN
X AMPANG TINGGI
X KENDONG
MALACCA
X ALOR GAJAH
PULAU GADONG O
JASIN X
X TANGKAK
X JEMENTAH
JOHORE
SINGAPORE
O KOTA BHARU
PASIR MAS X
X BACHOK
X MELOR
PASIR PUTEH X
KELANTAN
TRENGGANU
X KUALA LIPIS
X DONG
X PULAU TAWAR
PAHANG
X SUNGAI BLAT
PAHANG TUA
X KERDAU
X BAWANG
CHENOR X
X MENGKARAK
LABUAN
PAYA BAKONG X
KILANAS O
X LUMAPAS
KUALA ABANG X
BRUNEI
SARAWAK
O-EXPERIMENT STATIONS
X-TEST STATIONS
1939

This Test Station has been substituted for the former one at Seriab, as the soil is considered to be more typical of the heavy coastal clay.

Yields are possibly much lower in the first season than they will be subsequently. The order of yields of the different strains is very similar to those which have been obtained at Seriab.

KEDAH.

Telok Chengai Experiment Station.

This Experiment Station is situated on medium alluvial clay and is largely dependent on local rainfall for its water supply. Preliminary ploughing and repair of rice field bunds takes place as soon as sufficient water has collected in the *bendang*, about the beginning of April. The heavy rains usually commence about the end of July, which is much earlier than further south in the Peninsula.

This Station has produced some widely successful strains of Mayang Ebus, Reyong and Radin China, especially Mayang Ebus 80 and 88.

A Latin Square varietal trial was re-introduced this season, including Siam 29, with selections of the above mentioned varieties and bulked samples of two of the varieties now undergoing selection.

Variety	Mean Yield per 1/120th acre in lbs.
Siam 29 ...	28.9
Mayang Ebus 80 ...	31.4
Reyong 6 ...	29.4
Radin China 17 ...	27.6
Mayang Tekai ...	26.4
Serendah Sg. Dua ...	24.9

S.D. = 2.4
M.S.D. = 3.1 lbs.

Pure Line Selection.

Selections made during the previous season (1937-38) from the varieties Mayang Tekai, Serendah Sg. Dua, and Raja Muda were again planted in ear-to-row lines. The following table shows the ratio of the number of lines which have been retained to the number of lines under observation during the previous season.

Name of Variety	No. of Lines Planted 1937-38	No. of Lines Planted 1937-38
Mayang Tekai ...	100	25
Serendah Sg. Dua ...	100	24
Raja Muda ...	50	19

Each row contained 71 plants. The following observations were recorded:

(a) Mayang Tekai: out of 25 rows all have black tips except Nos. 67, 84, 47 and 29 which have self-coloured tips; No. 33 is aberrant, all plants being much smaller than the other rows and ripening earlier.

(b) Serendah Sg. Dua: showed much better growth than during the previous season. Rows 87, 89, 97 and 37 were taller than the remainder, but this may be due to soil heterogeneity.

(c) Raja Muda: still poor but to be continued for another year. Row 46 is aberrant having a small grain like Chubai; row 4 has black tips (all other rows being without this feature). Yields from each row were recorded.

Jitra Test Station.

This Station is situated on alluvial clay, and is not entirely dependent on local rainfall as water supply is usually obtainable from a dam in a nearby canal.

There was a good deal of lodging this season.

Variety	Mean Yield per 1/120th acre in lbs.
Siam 29 ...	37.7
Mayang Ebus 80 ...	34.1
Radin China 4 ...	31.5
Radin China 17 ...	31.9
Anak Kuching ...	36.2

S.D. = 1.7
M.S.D. = 2.5 lbs.

A second Latin Square trial was also laid out with Siam 29, Siam 76, Reyong 6, Reyong 20 and Mayang Ebus 88, but the last three, Reyong 20 and Reyong 6 in particular, were so severely damaged by rats that the trial was of no significance as a test of varietal yields.

Padang Prahu Test Station.

This Test Station is a new one situated north of Jitra in shallow clay soil typical of much of North Kedah and less productive than the alluvium at Jitra. Like most of the Test Stations in Kedah it is dependent on direct rainfall for water supply.

Variety	Mean Yield per 1/120th acre in lbs.
Siam 29 ...	20.9
Mayang Ebus 80 ...	21.7
Radin China 4 ...	20.4
„ „ 17 ...	21.5
Selindang Gunong ...	16.9
By inspection, S. Gunong, the unselected local variety, is significantly inferior to the selected strains.	

Sala Kanan Test Station.

This Station is also on alluvial clay and is dependent on local rainfall for water supply.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Siam 29 ...	(26.3) 31.0 Rat damage	Siam 29 ...	30.1
„ 76 ...	27.6	Radin China 4 ...	29.5
Mayang Ebus 80 ...	30.4	„ „ 17 ...	29.7
„ „ 88 ...	26.5	Reyong 6 ...	29.9
Radin Pasir ...	29.2	„ 20 ...	(16.2) Severe rat damage
Not analysed; severe rat damage in two plots of Siam 29. By inspection, M.E. 80 probably superior to M.E. 88.		Not analysed.	

Reyong 20 was sown and planted on the same dates as the other varieties, yet all its five plots were singled out by rats for much more severe attention than the other twenty plots.

Rantau Panjang Test Station.

The Station is situated on light alluvial clay and is dependent on local rainfall for water supply.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Siam 29 ...	22.4	Siam 29 ...	23.6
Mayang Ebus 80 ...	24.5	„ 76 ...	22.7
„ „ 88 ...	24.7	Mayang Ebus 88 ...	26.3
Radin China 4 ...	22.8	Reyong 6 ...	22.4
Anak Didek ...	24.3	„ 20 ...	(15.7) Severe rat damage
By inspection, no significant difference.		S.D. = 2.2 M.S.D. = 3.2 lbs.	

Heavy flooding from the Muda River was experienced between 24th and 30th of September, the crop being wholly submerged for 6 days.

Reyong 20 was again singled out for special attention by rats.

Langgar Test Station.

This Station is situated on light clay soil and is dependent on local rainfall.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Siam 29 ...	17.3	Siam 29 ...	18.4
Mayang Ebus 80 ...	19.4	To Seman 35 ...	18.2
„ „ 88 ...	14.5	„ „ 42 ...	18.8
Radin China 4 ...	17.3	„ „ 103 ...	18.0
„ „ 17 ...	16.0	Suban Intan ...	19.6
S.D. = 1.4 M.S.D. = 2.0 lbs.		S.D. = 1.0 M.S.D. = 1.5 lbs.	

This is the only Station which was appreciably affected by *Sclerotium oryzae* this season. The attack, however, was mild.

Pulai Test Station.

This Station is situated on sandy clay soil. Water supply is partly dependent upon local rainfall and partly upon irrigation from a stream.

Lodging was prevalent this season.

Variety	Mean Yield per 1/120th acre in lbs.
Siam 29 ...	32.1
Mayang Ebus 80 ...	37.4
Radin China 4 ...	35.9
„ „ 17 ...	36.3
Serendah Sg. Dua ...	31.9
S.D. = 1.6 M.S.D. = 2.3 lbs.	

It is noteworthy that the two Test Stations, Pulai and Jitra, within areas partly irrigated and not entirely dependent on local rainfall, have given the best returns of crops. These two Stations and Sala Kanan are usually the highest yielding Test Stations in Kedah.

Sik Test Station.

A new Test Station of just over 2 acres in the centre of Kedah, where trials will commence in the 1939-40 season. It is situated on light inland valley soil of apparently low fertility, but is usually cultivated, either by plough or by changkol. It is dependent on rainfall for water supply, and dry nurseries are customary.

Kulim Test Station.

A new Test Station of 5 acres in the south of Kedah, where trials will commence in the 1939-40 season. The soil is light and shallow, but irrigation water is obtainable in moderate amount from a nearby stream. Wet nurseries are used.

While the Test Stations in Kedah have given yields above average they are not especially high, but the total padi crop from the State of Kedah is the highest yet recorded, being about 240,000 tons of padi for 258,350 acres, or an average of nearly 2,000 lbs. padi per acre.

Langkawi Island Test Station.

Variety	Mean Yield per 1/120th acre in lbs.
Siam 29 ...	10.5
Nachin 10 ...	12.1
Mayang Ebus 80 ...	10.1
Reyong 20 ...	9.9
Puteh Meliyau ...	10.3
By inspection, no significant differences, but Nachin 10 again shows the highest average yield. Soil light and sandy.	

PENANG.

Genting Test Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Mayang Kuning 48 ...	18.6	Mayang Kuning 48 ...	18.2
Mayang SaBatil 5 ...	19.5	Seraup 15 ...	16.1
„ „ 6 ...	19.0	„ 371 ...	16.8
„ „ 8 ...	20.6	„ 146 ...	15.8
„ „ Unselected Local ...	18.7	„ 36 ...	14.2
S.D. = 1.4 No significant difference		S.D. = 1.3 M.S.D. = 1.8 lbs.	

The early part of the season was very dry, and planting was consequently rather later than usual. There was plenty of rain from August to October, but November and December were exceptionally dry, resulting in a shortened maturation period and reduced yields. There was good weather for harvest in February.

Mayang SaBatil is a popular Penang variety of padi, and strains selected at Titi Serong Experiment Station, Krian, are proving successful in Penang, in Province Wellesley South and in Krian, but the grain is difficult to thresh and it may not be so widely popular as was hoped, outside Penang, on this account.

PROVINCE WELLESLEY.

Bukit Merah Test Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Mayang Ebus 80 ...	18.4	Mayang Ebus 80 ...	19.6
„ „ 203 ...	18.1	Siam 29 ...	18.0
„ „ 209 ...	16.8	Reyong 6 ...	18.8
Siam 29 ...	16.6	Coimbatore 5 ...	16.9
Reyong 6 ...	18.5	Konchor ...	16.2
S.D. = 1.3 No significant difference.		S.D. = 1.0 M.S.D. = 1.4 lbs.	

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Mayang Ebus 80 ...	19.4	Siam 29 ...	17.6
„ „ 203 ...	17.8	Reyong 6 ...	17.7
Anak Didek ...	19.0	Anak Didek ...	18.3
Patok ...	19.0	Patok ...	18.3
Radin Pulai ...	17.0	Radin Pulai ...	16.6
S.D. = 1.2 M.S.D. = 1.7 lbs.		S.D. = 0.8 M.S.D. = 1.1 lbs.	

The soil is a medium heavy clay, which is typical of most of Province Wellesley. There is a supply of water by irrigation channel from a small river, but the Station is largely dependent on rainfall at the beginning of the season.

There was shortage of water early in the season, but adequate rain in December made a great improvement in the growth of crops.

Yields are not very high but they are considerably better than last season.

Results confirm the popularity of Mayang Ebus 80 in Central Province Wellesley, and that Reyong 6 is also a good strain for this district.

The local varieties Anak Didek and Patok are good types of padi both as regards yields and form of grain, and preliminary selection will be undertaken.

With rain in February, Siam 29 lodged in most parts of the Test Station. and Mayang Ebus 203 did not stand up as well as Mayang Ebus 80.

Recent selections at Telok Chengai, Kedah, were also introduced for observation, and similar observation lines of selected strains in the present Latin Square trials were also planted.

Yields from 600 plants were as follows:—

Variety	Yields per 600 plants	
	Gantangs	lbs.
Mayang Ebus 80 ...	8.0	46.0
„ „ 203 ...	7.6	44.3
„ „ 209 ...	5.8	33.5
Reyong 6 ...	6.5	37.3
Siam 29 29 ...	8.6	45.3
Coimbatore 2 ...	7.3	41.0
„ 5 ...	8.5	46.3
„ 7 ...	8.1	44.5
Mayang Tekai 6 ...	9.1	49.3
„ „ 8 ...	8.0	43.0
„ „ 14 ...	8.3	44.8
„ „ 41 ...	8.5	46.3
Serendah Sg. Dua 25 ...	7.8	41.0
„ „ 46 ...	10.0	53.5
„ „ 84 ...	8.1	46.5
„ „ 87 ...	8.8	50.3

It may be noted that the yields of Reyong 6, Siam 29 and Coimbatore 5 come in different sequence from those in the Latin Square trials.

It is clear that the final Kedah selections of Mayang Tekai and Serendah Sg. Dua will be well worth trial.

Sungei Acheh Test Station.

Variety	Mean Yield per 1/120th acre in lbs.
Mayang SaBatil 8 ...	29.1
Mayang Kuning 48 ...	27.3
Seraup 146 ...	25.0
Seraup 15 ...	24.1
Machang 42 ...	19.6

S.D. = 1.8
M.S.D. = 2.5 lbs.

A second Latin Square with Mayang Kuning 48, and Seraups 371, 48, 36 and 146 was laid down but portions of it were very severely damaged by rats. There was, however, much less rat damage on the Station as a whole than during last season.

The soil is medium heavy coastal clay, and conditions are very similar to those of north-west Krian in Perak. The Krian Irrigation Scheme has been extended to include over 4,000 acres in Sungei Acheh in South Province Wellesley.

In the multiplication plots Mayang Kuning 48, Seraup 371 and Mayang Sa-Batil 8 all gave very good yields.

Although irrigation water was of great service and effect during the dry weather early in the season, it was, this season, insufficient for the full requirement of this area of padi land. Dry weather from late December onwards provided the best of conditions for ripening and harvest.

PERAK.

Titi Serong Experiment Station.

Conditions were very similar to those of the 1937-38 season. Planting was again slightly late owing to shortage of water, but later conditions were satisfactory until time of harvest. Drainage was then again found to be difficult owing to seepage from the canal for the Sungei Acheh extension, which was still near full supply level; in consequence the neighbouring padi fields were two or three inches deep in water at harvest.

Attacks by rats were more evident during this season, and some damage was done by birds.

In certain areas of somewhat higher and inferior land the spike sedge, *Eleocharis ochrostachys*, Steud. (Malay—*purun ular*), was more conspicuous than usual. This sedge which is especially common in South Krian, appears to be associated with land giving poor yields.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Mayang SaBatil 8 ...	24.5	Mayang SaBatil 8 ...	21.0
Mayang Kuning 48 ...	23.0	Mayang Kuning 48 ...	19.3
Seraup 371 ...	18.3	Tongkat 2 ...	19.0
„ 146 ...	17.2	Machang 2 ...	15.5
„ 48 ...	16.7	Seraup 48 ...	13.6
By inspection, Mayang SaBatil 8 and Mayang Kuning 48 significantly superior to Seraups.		S.D. = 2.2 M.S.D. = 3.2 lbs.	

Mayang SaBatil 5 ...	21.7	Tongkat 2 ...	21.6
„ „ 6 ...	21.3	„ 1 ...	20.8
„ „ 8 ...	21.1	„ 7 ...	18.2
„ „ 9 ...	19.4	„ 10 ...	19.2
Seraup 48 ...	16.0	Seraup 48 ...	16.9
By inspection, Seraup 48 significantly inferior to Mayang SaBatil selections.		S.D. = 1.6 M.S.D. = 2.3 lbs.	

Mayang SaBatil and Mayang Kuning 48 have given fairly good yields but the Seraups are no better than the previous season. Seraup 371 remains the best of these in Latin Square trials.

Pure-line Selection.

In all, 199 strains were undergoing selection, including Machang 2 (Batu Kurau), Tongkat 1, 2, 7 and 10 (Batu Kurau), Mayang SaBatil 5, 6, 8 and 9 shown in Latin Square trials.

Machang 2 has not proved successful. Tongkats have very strong straw and low tillering capacity. They also have good grain type but are not likely to be

adopted for Krian and will be tried at Batu Kurau or Bukit Gantang next season. The Mayang SaBatil strains are good in respect of yields, grain type and straw strength, and extended trials have been arranged.

Other strains are as follows:—

Machang.—Nine strains from Krian. None of the Machangs are particularly good as regards yield, but they have fairly good straw and good grain type.

Mayang SaBatil.—Sixty-five more lines have been obtained from preliminary selection in Province Wellesley. Some of these lines appear to be very promising indeed.

Seraup.—Fifty-five further lines of Seraups from Krian were included, but yields are disappointing and vary considerably compared with those of last season.

Seri Raja.—Twenty lines out of the thirty-six from preliminary selection at Sungei Kepar and Selinsing (Krian) gave very varying results.

Serendah.—Eight lines out of the thirteen from preliminary selection at Bagan Serai (Krian). None is outstanding but all will be kept.

Chantek Puteh and Chantek Merak.—Twenty-one lines from Lenggong (Upper Perak).

Planting Distance Experiment.

Owing to considerable bird damage at Kuala Kurau, one of the Test Stations concerned, this experiment cannot be fully analysed this season, and it is to be continued during the 1939-40 season.

A comparison of results at Titi Serong (fairly good soil) and Bagan Serai (medium poor soil) is, however, of interest.

Planting Distance	1 ft. x 1 ft.		1½ ft. x 1½ ft.		2 ft. x 2 ft.	
Variety	S.48	S.371	S.48	S.371	S.48	S.371
Titi Serong						
No. of tillers ...	8.5	9.2	15.6	16.4	22.9	23.5
Yield per tiller. lbs. x 100 ...	0.56	0.52	0.69	0.60	0.78	0.73
Yield per hill lbs. x 100 ...	4.78	4.80	10.69	9.91	17.76	17.15
Yield per acre lbs. ...	2080	2090	2080	1930	1940	1870
Bagan Serai						
No. of tillers ...	9.6	9.9	18.5	18.8	28.2	26.8
Yield per tiller. lbs. x 100 ...	0.33	0.33	0.34	0.36	0.43	0.46
Yield per hill lbs. x 100 ...	3.15	3.24	6.20	6.65	12.13	12.18
Yield per acre lbs. ...	1370	1410	1200	1290	1320	1330

Kuala Kurau Test Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Mayang SaBatil 8 ...	18.2	Mayang SaBatil 8 ...	19.2
Mayang Kuning 48 ...	14.6	Mayang Kuning 48 ...	16.9
Seraup 371 ...	11.9	Tongkat 2 ...	17.0
„ 146 ...	11.9	Machang 2 ...	13.1
„ 48 ...	11.8	Seraup 48 ...	10.6

Great variation in yields due to attacks by rats and birds. Not analysed.

All the Malay padi planters around Kuala Kurau, on account of drought in June and July, delayed planting some weeks after it had been done at the Test Station, with the result that when the padi at the Test Station ripened it was the first in the locality and attracted concentrated attacks by birds. Rats also did more damage to the plants than usual, at an earlier stage of growth.

Tanjong Piandang Test Station.

This Test Station, which was opened this season, is situated in the heavy clay soil of old mangrove swamps north of Kuala Kurau, along the coast road.

At the commencement of the season, after the Seraup strains had been planted, there was not a great deal of water, and in this shallow water the concentration of sea water salt dissolved out of the ground was too great for the young padi plants.

The water was subsequently changed two or three times, and later, with plenty of it, the plants grew very well indeed.

The presence of salt will probably be a difficulty in connexion with padi cultivation in this extension for several seasons, especially if there should happen to be a shortage of irrigation or rain water.

Growth eventually was very good and heavy yields from Seraup strains were expected but it is the first land in this new extension to be planted with padi and, naturally, the crop suffered a very great deal from rat and bird damage.

Bagan Serai Test Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Mayang SaBatil 8 ...	19.0	Mayang SaBatil 8 ...	18.1
Mayang Kuning 48 ...	20.4	Mayang Kuning 48 ...	19.2
Seraup 371 ...	16.2	Tongkat 2 ...	16.5
„ 146 ...	16.1	Machang 2 ...	18.0
„ 48 ...	15.4	Seraup 48 ...	15.3
S.D. = 1.5 M.S.D. = 2.2 lbs.		S.D. = 1.7 M.S.D. = 2.5 lbs.	

Radin 4 ...	19.5	
„ 11 ...	19.4	
„ 13 ...	19.6	By inspection no significant differences.
Seraup 371 ...	20.9	
„ 48 ...	19.3	

Although there was an insufficiency of water during November and December, water control throughout the season was, on the whole, good and yields are better than they have been for several seasons. Mayang Kuning 48 has done fairly well, as last year, but it has a longish type of grain, not very suitable for mixing with the usual Seraup type for milling purposes.

Briah Test Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Mayang SaBatil 8 ...	17.7	Mayang SaBatil 8 ...	16.6
Mayang Kuning 48 ...	19.9	Mayang Kuning 48 ...	16.0
Seraup 371 ...	14.1	Tongkat 2 ...	13.7
„ 146 ...	14.5	Machang 2 ...	15.2
„ 48 ...	13.1	Seraup 48 ...	12.7
S.D. = 2.1 M.S.D. = 3.0 lbs.		S.D. = 1.1 M.S.D. = 1.6 lbs.	

Variety	Mean Yield per 1/120th acre in lbs.	
Radin 4 ...	15.9	
„ 11 ...	13.9	
„ 13 ...	13.5	S.D. = 0.8 M.S.D. = 1.2 lbs.
Seraup 371 ...	17.8	
„ 48 ...	16.6	

Except for a dry spell during the nursery period July-August, water supply and weather conditions were good and Seraup strains have yielded somewhat better than the Radin strains in contrast to the previous two seasons. Stem-borers and rat damage were less conspicuous than last season.

Mayang SaBatil 8 and Mayang Kuning 48, also long term varieties, have done fairly well and better than the Seraups.

Sungei Kepar Test Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Mayang SaBatil 8 ...	16.2	Mayang SaBatil 8 ...	14.9
Mayang Kuning 48 ...	12.8	Mayang Kuning 48 ...	12.7
Seraup 371 ...	10.6	Tongkat 2 ...	10.5
„ 146 ...	10.6	Machang 2 ...	8.4
„ 48 ...	10.3	Seraup 48 ...	9.1
By inspection, Mayang SaBatil significantly superior to other strains.		S.D. = 2.2 M.S.D. = 3.2 lbs.	

Radin 4 ...	15.3	
„ 11 ...	12.3	
„ 13 ...	10.3	S.D. = 1.4 M.S.D. = 2.0 lbs.
Seraup 371 ...	11.4	
„ 48 ...	10.4	

Nurseries failed entirely owing to drought and water shortage in July-August. Seedlings from Briah and Bagan Serai were supplied, and planting was effected somewhat earlier than in the surrounding padi fields. The Test Station is somewhat low-lying, and the padi being earlier than in the neighbourhood suffered from too much water at harvest which caused serious lodging of plants in all three Latin Squares.

Mayang SaBatil 8 and Radin 4 stood up best to the adverse conditions.

Selinsing Test Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Mayang SaBatil 8 ...	14.8	Mayang SaBatil 8 ...	14.2
Mayang Kuning 48 ...	14.3	Mayang Kuning 48 ...	13.9
Seraup 371 ...	10.3	Tongkat 2 ...	10.5
„ 146 ...	10.7	Machang 2 ...	12.2
„ 48 ...	11.6	Seraup 48 ...	10.2
S.D. = 1.4 M.S.D. = 2.0 lbs.		S.D. = 0.8 M.S.D. = 1.2 lbs.	

Radin 4 ...	10.9	
„ 11 ...	11.7	
„ 13 ...	11.0	By inspection, no significant difference.
Seraup 371 ...	10.1	
„ 48 ...	10.2	

There was insufficient water during the nursery period (July-August), and the subsequent crop was below average even for Selinsing. There was water in the fields for the late February-March harvesting.

As in most of the Test Stations in Krian, Mayang SaBatil 8 and Mayang Kuning 48 gave slightly better yields than other varieties. Mayang SaBatil has a grain of very good milling type, but Mayang Kuning grain is not so good. Present Mayang SaBatil selections are now believed to be somewhat difficult to thresh, and may be unpopular on this account.

Bukit Gantang Test Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Sakepol 15 ...	23.2	Siam 29 ...	32.1
Seraup 48 ...	18.3	„ 76 ...	28.4
„ 146 ...	22.0	Radin 11 ...	29.4
Mayang Kuning 48 ...	21.2	„ 13 ...	25.8
S.D. = 3.0 M.S.D. = 5.2 lbs.		S.D. = 1.9 M.S.D. = 3.3 lbs.	

Machang 2 ...	27.5	Tongkat 2 ...	24.3
„ 5 ...	28.7	„ 10 ...	25.4
„ 10 ...	26.5	„ 7 ...	19.8
Seraup 48 ...	25.1	Seraup 48 ...	19.4
S.D. = 2.2 M.S.D. = 3.8 lbs.		S.D. = 2.6 M.S.D. = 4.6 lbs.	

Seraup 371 ...	23.1	
„ 146 ...	21.7	S.D. = 1.3 M.S.D. = 2.3 lbs.
„ 48 ...	19.8	
Radin Che Mah ...	17.2	

Long maturation varieties were sown on 27th July and 3rd August and the Radins and Siams on 26th August and 5th September respectively.

Dry weather at early nursery time was a difficulty but conditions during the season were normal. Rain in February interfered somewhat with regular ripening and harvest; total yield, however, was good, averaging 2,300 lbs. per acre.

Since 1933-34 season Seraup and other long term varieties have been given trials at Bukit Gantang, in addition to Radins, Siams and other medium or short term varieties, and the long term varieties have always been much or slightly better.

This season, however, the Radins and Siams did not suffer, as did the long term varieties, from a dry nursery period, and have given better crops of grain. They ripened a few days after the Seraups and may have been freer from pest damage, but they lodged badly. Lodging was very serious in Radin Che Mah, was bad in Siam plots, and fairly bad in plots of Radin 11 and 13 and Tongkat 2 and 7.

Bruas Test Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Seraup 146 ...	14.7	Siam 29 ...	19.1
Seraup (Bruas) ...	17.3	Pahit (Bota) ...	17.3
Pahit (Bruas) ...	17.5	Seri B. Puteh ...	13.4
Chantek ...	16.9	Radin Deli ...	15.9
Sakepol ...	18.2	Medan Petani ...	11.5
S.D. = 3.0 M.S.D. = 4.4 lbs.		S.D. = 3.0 M.S.D. = 4.4 lbs.	

Seraup 36 ...	20.0	
„ 146 ...	19.4	S.D. = 2.7 M.S.D. = 4.7 lbs.
„ 371 ...	11.2	
Siam 29 ...	24.6	

Yields are very similar to those of the previous season.

By a comparison of the yields of the standard strains in the two Latin Squares of unselected varieties with their yields in the Seraup-Siam square, it would appear that there is a marked difference of soil fertility in favour of the latter.

It would seem that the local varieties Sakepol, Pahit, Seraup and Chantek may be good, and selected strains of these might be most successful around Bruas.

Talang Experiment Station.

There was frequent failure of the irrigation dam, and in consequence lack of water during the season. Crops were slightly below average.

Mayang Ebus selections (Krian new series) have again given good yields. There are six lines of these, Nos. 10, 11, 13, 23, 30 and 32, two of which have not been tried in Latin Squares. Mayang Ebus 10, the poorest this season in the Latin Squares, was the only one which did well in the pure lines.

Talang Experiment Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Mayang Kuning 48 ...	23.7	Mayang Kuning 48 ...	25.9
Seraup 371 ...	21.4	Seraup 371 ...	20.8
„ 146 ...	20.3	Radin 11 ...	18.8
„ 48 ...	23.4	Siam 29 ...	19.7
By inspection, no significant differences		S.D. = 2.1 M.S.D. = 3.7 lbs.	

Mayang Ebus 88 ...	22.7	Reyong 20 ...	21.4
„ „ 202 ...	22.0	Siam 29 ...	19.9
„ „ 203 ...	24.3	Radin 1 ...	24.7
„ „ 210 ...	18.8	„ 13 ...	15.3
S.D. = 1.4 M.S.D. = 2.4 lbs.		S.D. = 3.4 M.S.D. = 5.9 lbs.	

Mayang Ebus 10 ...	29.1	Mayang Ebus 10 ...	25.1
„ „ 11 ...	33.6	„ „ 11 ...	25.5
„ „ 13 ...	30.6	„ „ 30 ...	26.8
„ „ 203 ...	31.2	„ „ 203 ...	25.6
S.D. = 1.3 M.S.D. = 2.3 lbs.		By inspection, no significant difference.	

Hybrid 1/3 ...	18.5	
„ 1/9 ...	19.6	
„ 1/11 ...	16.9	S.D. = 1.7 M.S.D. = 2.5 lbs.
„ 1/14 ...	18.1	
Siam 29 ...	19.2	

Of the hybrid selections H 1/9 is again slightly the better. All four selections have the robust, erect, low-tillering straw of Radin 2, the female parent, while H 1/9 appears to be at least as good as the male parent, Siam 29, as regards yield of grain. Field trials so far have not been very successful but are being continued both at Talang and Bruas Stations.

Pure Line Selection.

Observations were continued on 31 lines of the local variety Radin Che Mah, and on 14 lines of Chantek Puteh and 7 lines of Chantek Merah from Lenggong.

Radin Che Mah, a six months variety, again did well. Tillering was good and there was no lodging. Chantek Puteh and Chantek Merah both showed a tendency to lodge, but Chantek Merah was worse in this respect. They ripened about a month later than Radin Che Mah.

Sungei Manik Experiment Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Mayang SaBatil 8 ...	24.0	Siam 29 ...	18.6
Mayang Kuning 48 ...	21.9	Radin 11 ...	13.8
Seraup 371 ...	21.9	„ 13 ...	17.4
„ 146 ...	20.0	Seraup 371 ...	19.3
„ 48 ...	21.1	„ 48 ...	18.8
S.D. = 2.3 M.S.D. = 3.4 lbs. but Z test did not show significance.		S.D. = 3.4 M.S.D. = 5.0 lbs. but Z test did not show significance. Most of this square lodged during ripening in January.	

Variety	Mean Yield per 1/120th acre in lbs.
Radin 4 ...	22.4
„ 11 ...	18.6
„ 13 ...	20.7
Mayang Ebus 88 ...	21.2
„ „ 203 ...	17.8
S.D. = 1.1 M.S.D. = 1.6 lbs. Mayang Ebus strains lodged in January.	

The development of the bunding, irrigation and drainage scheme for this new padi-growing land in Lower Perak made excellent progress since the previous season. Stages I and II consist of 8,119 acres of padi land of which 7,955 acres are alienated, and 5,976 acres planted during the season under review. The average yield for Stage I (5,000 acres) was 300 gantangs (1,650 lbs.) padi per acre.

The Experiment Station did not suffer from rat damage as in the 1937-38 season, but variations in levels of the different divisions caused difficulties with the regulation of the water supply. Growth, however, was good but high wind on 21st December caused some lodging, especially of Siam 29 and Seraups 48 and 146. Average yields were: 1937-38 season 217 gantangs padi per acre, 1938-39 season 345 gantangs per acre.

Lampam Test Station.

This Test Station is being established in Stage III of the Sungei Manik padi-growing area and about 3 miles from Sungei Manik Experiment Station, but is not yet in operation.

SELANGOR.

Kajang Test Station.

This Test Station has been abandoned, owing to deterioration of the padi land and the impossibility of obtaining satisfactory yields.

Kuang Test Station.

Yields of padi at this Test Station have been good, poor, or very poor, varying with seasons and the portion of the Station on which the padi was planted.

In the 1938-39 season sowing took place early in June instead of May, and whether for this reason or not, yields have been particularly poor. Siam 29, which is popular locally, was the only variety to give even small yields of grain.

In this particular padi-growing area the soil varies rather irregularly from very sandy to a stiff white clay; iron oxide is conspicuous in the clay soil, along root traces, and on the surface of the water. On the Station the stiff white clay is chiefly in the north-west section and it is here that the poorest yields occur, although they are not entirely confined to the clay soil.

Tanjong Karang Test Station.

This Test Station is situated in the north-west of Selangor on a strip of land which lies between the coast and a large area of jungle.

The soil is very good coastal clay and in favourable seasons can produce excellent crops of grain.

In common with much of the west coast, this area has a comparatively low average rainfall, and though in 1935-36 relatively very satisfactory crops were harvested on the Test Station, for the last three seasons padi cultivation has been a failure due to lack of rainfall and to rat damage.

There are, in this coastal strip north of the Sungei Tengi, about 30,000 acres of potential padi land, but owing to the low average rainfall of the coast there is always liability to shortage of fresh water, and until the scheme for providing an assured supply of irrigation water is completed the land cannot be relied upon to give good crops of padi.

For some years a small area has been intermittently cultivated with padi but the fewer the number of people who continue to attempt to plant, the worse is the rat damage. This season no cultivation was carried out in the neighbourhood of the Test Station because of lack of rainfall, and any hopes of getting any crop at the Test Station were negatived by the incursion of large numbers of rats from the fallow land all round.

In the Sempadan mukim adjoining Tanjong Karang a fairly good crop was obtained over a small area by the *tugal** method of planting and this seems a possible temporary method until such time as irrigation water can be provided.

Sungei Haji Durani Test Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Siam 29 ...	19.2	Siam 29 ...	27.0
Radin 11 ...	20.0	Mayang Ebus 203 ...	19.8
„ 13 ...	14.9	„ „ 209 ...	24.2
Reyong 6 ...	18.7	Radin China 4 ...	22.8
„ 20 ...	15.0	„ „ 17 ...	22.4
S.D. = 2.7 M.S.D. = 3.9 lbs.		S.D. = 2.8 M.S.D. = 4.1 lbs.	

This Test Station is also situated on the north of the Selangor coast, but because it is somewhat low-lying it was liable to damage by excess of water, and a water gate was installed which has removed this danger of flooding. There is still notable variation in soil fertility.

It has been decided, however, that one Test Station is sufficient for the Panchang Bedena padi-growing area, and as a better and more convenient site has been chosen at Parit 4, the Sungei Haji Durani Test Station has now been given up, as well as the old Panchang Bedena Test Station at Parit 8.

Seed was sown this past season at the end of August, but seedlings were 100 days in the nursery beds owing to lack of rain and were not planted out till early December. Yields would probably have been even better if seedlings had not been

* *tugal* = a pointed stick (for making holes into which a few padi seeds or seedlings are planted.)

weakened by this prolonged stay in the nursery beds. They should, however, be comparable with those to be obtained at the new site, and it is of interest to note that Siam 29, Mayang Ebus 209 and Radin 11 have done well.

Panchang Bedena Test Station (Parit 8).

This Test Station has been given up. It was on slightly higher land and adjoining uncultivated land. It was subject, therefore, to serious water shortage and to rat damage.

Panchang Bedena Test Station (Parit 4).

This new Test Station at Panchang Bedena is conveniently situated within an area of 15,500* acres of padi land in the north-west of Selangor, of which 12,400 acres have already been alienated for padi cultivation. About 11,500 acres were planted in 1936 but lack of water and successive comparative failures have caused a reduction in area planted to about 8,000 acres in 1939. The average yield for the 1938-39 season was approximately 240 gantangs (1,300 lbs.) per acre.

The Panchang Bedena area lies immediately north of the Tanjong Karang area of 30,000 acres yet to be developed. It is potentially high-yielding and for improvement waits upon the completion of the same scheme for supply of irrigation water from the Sungei Tengi.

Work at this Test Station will therefore be of considerable interest and importance, as results obtained will apply generally to a total area of between 40,000 and 50,000 acres of potentially high-yielding padi land.

This first season observation lines of a good local variety and 11 selected strains were planted. The local variety, Mayang Susun, gave excellent yields, while Siam, Mayang Ebus, Radin China and Reyong strains varied from very good to fairly good.

NEGRI SEMBILAN.

Ulu Klawang Test Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Siam 29 ...	20.5	Siam 29 ...	26.4
Reyong 6 ...	18.4	Radin 13 ...	26.4
„ 20 ...	16.9	Mayang Ebus 209 ...	25.1
Serendah Kuning ...	20.7	Milek Kuning 3 ...	30.0
S.D. = 1.4 M.S.D. = 2.4 lbs.		S.D. = 2.5 M.S.D. = 4.3 lbs.	

* Potential padi land in Sungei Panchang and Panchang Bedena mukims previously estimated at 17,000 acres.

The soil is a medium heavy clay and water supply is obtained by irrigation from the Sungei Klawang.

The dates of sowing for this season were again made later in continuance of the policy prompted by results of trials in 1936-37 and 1937-38 seasons.

Sowings took place from 16th May to 9th June compared with 1st April in the 1936-37 season. Although the yields from the first Latin Square are somewhat disappointing, those in the second Square are the best yet obtained.

The total yield from the whole Test Station of $5\frac{1}{2}$ acres was 1,700 lbs. per acre, which is appreciably higher than formerly, indicating that the adoption of the later sowing and planting dates may have been advantageous. Still slightly later sowing dates may be even better.

The success of the sowing date trials at the Test Station is reflected in the cautious adoption of later sowing dates for the Jelebu District, in which the Test Station is situated.

The difficulties of water control and the dangers of rat and bird attacks make it essential that all contiguous padi land is sown and planted more or less uniformly to give uniform harvest. The sowing and planting dates on all Padi Test Stations are, therefore, governed to a very large extent by those on surrounding land.

Ampang Tinggi Test Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Radin 2 ...	29.9	Siam 29 ...	26.9
„ 11 ...	26.4	Nachin 11 ...	28.7
„ 13 ...	19.5	Milek Kuning 3 ...	23.9
Serendah Kuning ...	23.5	R. Bersanding ...	27.0
S.D. = 1.5 M.S.D. = 2.6 lbs.		S.D. = 1.3 M.S.D. = 2.3 lbs.	

Reyong 20 ...	25.6	Radin Siak 7 ...	22.3
Mayang Ebus 203 ...	22.1	„ „ 17 ...	23.7
Milek Puteh 9 ...	29.1	„ „ 18 ...	23.8
Serendah 875 ...	14.4	„ „ 34 ...	24.8
S.D. = 1.8 M.S.D. = 3.1 lbs.		S.D. = 1.0 M.S.D. = 1.7 lbs.	

This Test Station is situated in a padi growing area which lies between the Muar and Seri Menanti Rivers, and is liable to frequent flooding. This season, however, only minor flooding occurred, on 7th February.

The Station was first used in 1935, and in the 1935-36 and 1936-37 seasons sowing dates of many of the varieties were found to be ill-adjusted. In the 1937-38 season all varieties were sown much too late, in August and September.

This past season sowing dates were adjusted in July and August. Yields, generally, were very satisfactory, but the effect of the adjustment cannot be estimated, as the season was fortunate with very favourable weather, and was the first in which serious flooding did not cause damage to the padi plants.

Kendong Test Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Milek Kuning 3 ...	19.0	Siam 29 ...	18.2
Sakepol 15 ...	16.6	Nachin 66 ...	13.6
Seraup 36 ...	14.9	Radin 13 ...	15.0
„ 48 ...	15.6	Serendah 11 ...	16.9
Serendah Kuning ...	11.1	Serendah Kuning ...	13.8
S.D. = 2.2 M.S.D. = 3.2 lbs.		S.D. = 2.3 M.S.D. = 3.4 lbs.	

Reyong 6 ...	17.9	By inspection, no significant differences.
„ 20 ...	16.2	
Radin Siak 34 ...	17.8	
Serendah Kuning ...	17.6	

The Kendong Test Station was first opened in the 1932-33 season, and the date of sowing used in that season for all varieties was 31st May, 1932, with considerable success for long and medium term varieties. In the 1933-34 season the sowing date adopted for long and medium term varieties was 20th March, 1933, and yields were much lower.

Sowing dates subsequently adopted were in April-May for long term varieties and in May-June for medium term varieties, but have been slightly irregular with a tendency to be too early. Yields, particularly in 1935-36, have been poor. The soil is a variable sandy clay.

This season, with good weather, except at harvest, and slightly later and better adjusted sowing dates (long term 2nd May, medium term 8th June, short term 8th July, 1938), yields, though still not very high, have been much better than any since those of the long and medium term varieties in the first season, which they approximately equal.

Various results give reasons for believing that it would be an advantage if the sowing dates were, in general, brought slightly later still, particularly those of Siam 29 and Milek Kuning 3.

PAHANG.

There are two chief distinctions in the padi growing lands of Pahang, namely the irrigated, terraced land best known as *sawah*, and the *paya-paya* or swamps along the Pahang River which have no assured water supply.

In parts of Pahang, *paya* is used indiscriminately for any land cultivated with wet padi, but the term *sawah* is readily understood. It is thought to be wise, and is convenient in this article, to make a clear distinction between two very different conditions.

Sawah.—The *sawah* lands are mainly in the Raub and Lipis Districts. Apart from the rather unpredictable weather of Pahang, these have no particular problems as in most cases they are served by irrigation channels or by streams with sufficient catchment areas to provide continued supplies of water during the season. Drainage is also easily obtained. The soil is tilled most usually by changkol, an implement like a heavy English hoe.

Paya.—Padi-growing in the riverine *paya* lands of Pahang, on the other hand, presents special difficulties. The *paya-paya*, with few exceptions, have no sufficient hinterland of hills to maintain a regular supply of water during the padi season, and unusual methods have been adopted for the more or less successful cultivation of padi.

The swamps are formed between low hills and the raised banks of the meandering Pahang River, and in places they extend for several miles from the river. They are numerous and vary in extent from a few to several hundred acres. Where necessary, earthworks have been built to complete the enclosure of the low-lying land, and drainage channels and various forms of water-gates have been made in all the *paya-paya*.

Fairly soon after harvest all water-gates are closed to accumulate water in these swamps from the rains of March and April. From about the end of March ground on nearby higher land is cleared for sowing nurseries, and sowing is normally carried out during April, but varies according to the weather, the variety of padi, and the position along the river.

During June and July the level of the water in the *paya* is lowered by stages. The land is cleaned by pulling or cutting weed growth, and sometimes cultivation is done by trampling with buffaloes. Planting is then done with the expectation of, or on the arrival of, further rains.

Apart from the higher level of land at the edges and from top to end, there is often great irregularity throughout the *paya*. These differences in levels are undoubtedly an important feature of padi cultivation in *paya* conditions, normally ensuring that some reasonable crop will be obtained, even with very dry weather or minor floods.

The primary difficulty is the absence of assured or sustained supplies of water, but provision of irrigation water for so many small areas would entail such expenditure in construction of storage reservoirs as would be prohibitive. Experiments in *paya* management are, therefore, very desirable with a view to overcoming, as far as possible, this difficulty, by effecting improvements in control and/or conservation of water.

Dong Test Station.

This Station has good soil, with plots slightly terraced, and a good supply of irrigation water, and is representative of considerable areas of such *sawah* or irrigated padi land in the Raub District of Pahang.

An optimum-date-of-sowing preliminary experiment was carried out here with 6 varieties, Siam 29, Nachin 11, Mayang Ebus 88, Milek Kuning 3, Radin China 4 and Radin Siak 24, with six dates of sowing between 5th June and 20th August, 1938.

Varieties were randomized within blocks and sown according to arranged dates in succession "down-hill" for convenience of water supply, as a complicated system of water control was to be avoided in the preliminary trial.

A full analysis cannot be made, because of several unanalysable factors, but the general tendency was for padi sown on 5th June to be better than later sown padi.

A properly designed experiment is being laid down for the 1939-40 season with the same six dates of sowing but with only 3 varieties, Siam 29, Milek Kuning 3 and Radin China 4.

Kuala Lipis Test Station.

This is a small Test Station some 20 miles north of Dong in a convenient but isolated small block of terraced *sawah*. Water supply is fortuitous and it is not always possible to plant as early as desired. The site also is liable to flooding from the Lipis River.

An optimum-date-of-sowing trial was laid down with 4 varieties of padi, Siam 29, Reyong 20, Milek Kuning 3, and Milek Puteh 148, and with three dates of sowing, 20th July, 4th August and 20th August.

The plants were, however, transplanted into plots arranged "down-hill" according to date of sowing, and the lowest plot, in particular, suffered severely from flooding which affected both maturation periods and yields. The results cannot be regarded as of any significance.

The experiment designed for 1939-40 season at Dong is to be replicated at Kuala Lipis.

Pulau Tawar Test Station.

This Test Station was recently established in the new inundation scheme area of Padang Kangsar a few miles below Jerantut.

It is a fairly extensive area of land within a large bend in the Pahang River, which, prior to the floods of December, 1926, included much deep swamp with *tenggala** padi round the edges. Most of the deep swamp was filled up by sand and silt and it seemed suitable for padi cultivation.

Efforts have been made to inundate the area, but it has been found it is impossible to retain the water for any length of time, and it is probable that it is able to escape through channels filled with porous sandy deposits.

The Test Station was established on the inner lateritic periphery of the padi-growing area, which even with good water supply would require several years of padi-planting before satisfactory growth could be obtained.

In contrast to this, the main area of the original swamp contains such a rich deposit of silt that in places the padi plants grow to heights of 7 ft. with luxuriant foliage, but without an equivalent yield of grain.

In the two previous seasons when the Test Station was sited above the 97.5 ft. contour no crop at all was obtained, but in this season just concluded, although conditions could hardly have been worse, some crop at least, though very meagre, was obtained, and the 97 ft. contour will continue as the approved level for inundation.

Efforts will be made in the 1939-40 season to increase the water-holding capacity of the soil by a method of puddling by means of ploughing and rolling.

Kerdau Test Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Siam 29 ...	2.6	Siam 29 ...	5.4
Milek Kuning 3 ...	9.1	Reyong 6 ...	4.3
Nachin 66 ...	7.3	„ 20 ...	8.0
Radin China 4 ...	5.2	Radin 13 ...	8.0
Seri Ayer ...	7.4	Seri Ayer ...	11.3

The Test Station is situated a few miles west of the Pahang River north of Temerloh, and is typical of the riverine *paya* padi lands with their lack of water-catchment hinterland and liability to frequency of floods from the Pahang River.

* *tenggala* = a plough.

Plot yields varied in range between nil and 20.4 lbs. and average yields are hardly worth recording except as a comparison with those of the previous two seasons. Sowing took place between 1st April and 16th June and the relative sowing dates of Siam 29, Radin China 4, and Reyong 6 and 20 were very faulty.

The abnormally dry October at a critical stage of growth seriously affected the crop, except in the lowest-lying portions of the *paya*. This is a reversal of the conditions of the 1937-38 season, when the lower-lying sections were overwhelmed by floods at the same time of year.

Mengkarak Test Station.

Another riverine *paya* Test Station, south of Temerloh, and closer to the river than Kerdau. It is somewhat lower-lying and not so liable to dry out, but is more subject to severe flooding.

Siam 29, Milek Kuning 3, Reyong 20, Radin China 4, Mayang Ebus 88, Radin 13, Nachin 66 and Radin Siak 34 were planted in ½ acre blocks for observation.

Milek Kuning 3 gave the best crop, followed by Reyong 20, Siam 29 and Nachin 66, but incomparable sowing dates make comparisons between varietal results very uncertain.

Sowing took place between 9th April and 24th June. Transplanting was held up by flooding in June. The land did not dry out completely during the October drought, but in January most of the padi was submerged for 3 days during the ripening stage by a high level of flood water.

Chenor Test Station.

This is a new riverine *paya* Test Station of 6 or 7 acres on a site recently acquired at Chenor along the Pahang River half way between Mengkarak and Lubok Paku. Experiments will commence in the 1939-40 season.

Bawang Test Station.

This Test Station is an independent block of about 3 acres of level *sawah* below Bawang village, near Lubok Paku, which is on the north bank of the Pahang River half-way between Temerloh and the coast. Water supply, from the Sungei Tekok, and drainage are good, but there is liability to excessive water when the Sungei Tekok is in flood, which is not infrequent.

The Station is surrounded by scrub and jungle and is liable to pest damage. It has been in operation since 1935-36 and has given very variable returns, partly due to confusion over relative lengths of maturation periods in local conditions.

Mayang Ebus 80, sown 23rd May, and harvested 7th January, was the only strain to give over 300 gantangs (1,620 lbs.) per acre this season.

A preliminary optimum-date-of-sowing experiment will be tried here in the 1939-40 season, with 4 varieties, Milek Kuning 3, Mayang Ebus 80, Siam 29 and Seri Bumi.

Pahang Tua Test Station.

This Test Station, which is situated on old *tenggala* padi land near the mouth of the Pahang River, is being provided with irrigation water, pumped up from the Sungei Pahang Tua, to supply an area of over 3,000 acres. (Previously estimated at over 2,000 acres).

The soil is good, but the land is somewhat high-lying and therefore without a natural supply of water for irrigation or inundation.

Work on the irrigation scheme is in progress and it will be possible to commence supply of irrigation water for the 1939-40 season for a portion of this area including the Test Station.

This 1938-39 season, weed growth was cut and the land was ploughed and harrowed twice and a few observation plots were planted.

Seed was sown at the end of August and in the middle of September, but transplanting was made difficult or was delayed by the unprecedented drought in October.

At the end of that month seedlings in the nursery beds were very faded and would not have survived much longer. They were planted out with little hope of success and were put into dibble holes. Heavy dews, however, kept the holes supplied with water enabling the weak seedlings actually to recommence development of sturdy young roots, and when rain fell during the first week of November and in December the plants made rapid recovery.

Yields of over 300 gantangs were obtained from Milek Kuning 3, Siam 29 and Reyong 20, and very satisfactory crops may, therefore, be expected when the pumping scheme is in operation.

A preliminary optimum-date-of-sowing experiment, similar to that at Bawang, is to be given trial in the 1939-40 season, with six dates of sowing between 4th July and 20th September, and using 4 strains of padi, Milek Kuning 3, Siam 29, Reyong 20, and local unselected Milek Kuning.

Sungei Blat (Paya Besar) Test Station.

This Station is situated near the coast north of Pahang Tua in an area of 3,000 acres of old jungle swamp which was filled up during the floods of December, 1926.

There is a 4 to 6 ins. layer of organic material between the original heavy clay and the upper 6 to 7 ins. layer of silt, and although a sound irrigation and drainage scheme is now working satisfactorily, yields are still poor, due presumably to this "peaty" layer.

Cultivation experiments have given rise to some hope that deep cultivation may, in time, bring about improvement, and these experiments are to be continued.

There is still a lot of timber lying about in the *sawah*, and numerous undecayed tree stumps. The top soil, too, is still raw, and sedges and bog grasses are very abundant.

When most of the stumps and timber have decayed or been broken up, buffaloes will probably be used to a much greater extent, and will give the land necessary trampling cultivation.

Minor flooding occurred during December and January.

The same preliminary optimum-date-of-sowing experiment as at Bawang is to be tried here also, with Siam 29, Milek Kuning 3, and a local variety called padi Chendar.

MALACCA.
Pulau Gadong Experiment Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Siam 29 ...	29.3	Siam 29 ...	17.1
Serendah Puteh 1 ...	22.1	Serendah Kuning 1 ...	14.9
„ „ 3 ...	22.3	„ „ 3 ...	15.4
„ „ 6 ...	21.5	„ „ 4 ...	14.8
		„ „ 5 ...	15.5
By inspection, Siam 29 significantly superior.		By inspection, no significant differences.	

The rainfall during this season, July to February, was well below average, and dry periods interfered with cultivation and planting. The second Latin Square was on drier ground, hence the lower standard of yields.

The soil is a medium stiff clay, and the land is included in the area served by the Tanjong Minyak Irrigation Scheme. The supply of irrigation water is not quite adequate, however, and the old pump is at present unable to keep water on the higher portion of the Station. It has not yet been possible to instal a new and larger pump.

Pure-line Selection.

Ten lines of local Siam type padi were grown for the third year for observation on strength of straw. Only one line shows real promise but four were selected for further trials.

Eleven Pahang varieties were undergoing selection. Eight of these were in their second year of observation, of which 3 Milek Merah lines were the best. The 3 third-year varieties, Seri Ayer, Milek Puteh and Terong Papan all did fairly well, and various selections have been added to pure strain lines for continued observation next season.

Former selections of Serendah Puteh and Serendah Kuning were tested in Latin Square trials but yields were below those of Siam 29.

Serendah 27, 122, 144 and 149 did well in field trials.

Siam 29, Nachin 11 and Milek Puteh 9 are the highest yielding and most popular strains. Demands for seed padi exceeded available supplies.

Siam 29 is still the most popular padi but Malay farmers say that although it is the most palatable, it is not as satisfying or filling as Nachin 11.

Alor Gajah Test Station.

Weather was very dry until the end of August, when seed was sown. Transplanting at the Test Station was left till seedlings were the normal 44 days in the nursery, and they were not sufficiently well established to withstand the amount of water brought on with the onset of the rains.

The plants were weak and earing was late, and what little grain was set was attacked by *pianggang* (*Leptocoriza* sp.). The crop was not worth harvesting, except for one plot of Siam 29.

Native owners in the neighbourhood better anticipated weather probabilities, and transplanted at 25 days. The young plants were well grown by the time the heavy rains came, and good crops were expected. Unfortunately few people reaped a satisfactory crop on account of damage by *pianggang*.

Jasin Test Station.

The season was a good one on the whole although weather conditions were difficult in the early stages. Growth of all varieties was good and even, and no pest damage occurred until after flowering when the young grain was severely attacked by *pianggang*, which was responsible for a considerable reduction in crop compared with the previous season.

The varieties grown were Siam 29, Milek Puteh 9, Serendah 141 and 149, and Radin Siak 34. Radin Siak 34 was very good, giving almost 2,800 lbs. per acre, but Siam 29 yields were poor as it suffered most from *pianggang* and by lodging.

The Sungei Kesang Irrigation Scheme is now completed and will be in operation during the 1939-40 season. This Scheme will supply water to an area of 600 acres including the Jasin Test Station.

Malacca Coastal Region.

Normally, along the Malacca coast, a fairly high total of rainfall occurs during June, July and August, but occasionally, as in 1938, this period is particularly dry in that region and the unexpected shortage of water is liable to have a serious effect on the season's cultivation of padi.

Padi lands in Malacca are not served by any river which has its origin in a substantial jungle catchment area, and the flow of water in all the small streams, especially along the coast, is immediately affected by local rainfall.

JOHORE.

Jementah Test Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Siam 29 ...	21.8	Milek Kuning 3 ...	13.3
„ 76 ...	15.3	Radin China 4 ...	10.3
Reyong 6 ...	16.1	„ „ 17 ...	10.3
„ 20 ...	18.3	Mayang Ebus 88 ...	12.9
Mayang Ebus 203 ...	11.6	„ „ 203 ...	10.9
S.D. = 5.5 M.S.D. = 8.0 lbs.		By inspection, no significant differences.	

Radin 13 ...	10.9	Reyong 6 ...	11.8
Serendah Kuning ...	15.3	„ 20 ...	11.8
„ Puteh ...	10.7	Radin 2 ...	5.4
Nachin Puteh ...	15.0	Daron ...	7.9
Lembot Tembiling ...	9.3	Lembot Tembiling ...	4.3
Great variation in yields of sub-plots. Results not analysed.			

At the time of sowing in May, and transplanting in June-July, dry weather was experienced, but with the help of the irrigation system at the Test Station, it did not affect these operations. Heavy rain fell towards the end of October and flooding occurred twice, while in November heavy rain and high winds caused lodging. Dry weather prevailed during harvesting in December-January, which was fortunate, as these months are usually those of heaviest rainfall.

Selection of Lembot Tembiling is contemplated but cannot be undertaken immediately. It is a popular variety of padi giving good yields and widely grown locally. Its yields in Latin Square trials this past season are very disappointing.

Tangkak Test Station.

An abnormally dry spell was experienced during July but only Milek Kuning 3 had then been sown. Other varieties were sown in August, and this resulted in Milek Kuning 3 being relatively too early for proper comparison in the Latin Square trial.

Tangkak Test Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Siam 29 ...	27.1	Siam 29 ...	30.00
Reyong 20 ...	25.9	Reyong 20 ...	27.2
Nachin 66 ...	18.2	Nachin 11 ...	15.5
Radin China 17 ...	23.6	Radin China 17 ...	23.8
Serendah Kuning ...	22.4	Serendah Kuning ...	25.2
S.D. = 1.2 M.S.D. = 1.8 lbs.		S.D. = 3.1 M.S.D. = 4.5 lbs.	

Siam 29 ...	27.9	Reyong 6 ...	25.0
Reyong 6 ...	24.9	Radin China 4 ...	24.6
Reyong 20 ...	24.4	„ „ 17 ...	23.8
Radin Siak 34 ...	19.1	Radin Siak 34 ...	20.6
S.D. = 2.6 M.S.D. = 4.5 lbs.		S.D. = 1.6 M.S.D. = 2.8 lbs.	

Nachin 66 ...	16.6	
Milek Kuning ...	13.6—sown early.	S.D. = 3.7 M.S.D. = 6.4 lbs.
Milek Puteh 148 ...	8.1—stem borer attack.	
Serendah Kuning ...	13.5	

Following heavy rains in October, flooding occurred on two occasions, but no damage resulted, while harvesting was completed in ideal conditions during the first week of March.

Tangkak and Jementah Padi Test Stations, both on medium heavy clay soil, are only about 20 miles apart in the north-west of Johore, and while for Tangkak, the highest average rainfall is in October, and for Jementah, in January, the occurrence of rainfall is very similar in trend. It is surprising, therefore, that the padi seasons should be so different, being from May to January at Jementah, and from August to March at Tangkak.

Some standardized trials with reciprocal dates of sowing would be of interest, and should be informative.

Tenglu Test Station.

This Test Station is situated in the north-east corner of Johore in the padi-growing district of Endau, with heavy rains in December and preparation of padi fields in March. Conditions are similar in many respects to those pertaining to several of the Test Stations in Pahang and the results of sowing-date experiments may apply here.

Critical experimentation has, however, been discontinued for the present until the problem of water control has been fully examined by the Drainage and Irrigation Department. An irrigation channel and water gates are being constructed, but will not be ready in time for the commencement of the 1939-40 season.

KELANTAN.

Kota Bharu Experiment Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Siam 29 ...	20.3	Singgora 19 ...	19.3
Reyong 6 ...	19.2	„ 22 ...	18.0
„ 20 ...	(16.3) 19.9	„ 24 ...	(15.8) 19.4
Mayang Ebus 88 ...	20.3	„ 29 ...	(15.8) 18.2
Radin China 4 ...	(10.8) 3 plots affected.	„ bulked ...	(17.5) 20.0
Bird damage severe; not analysed.		Four abnormally poor sub-plots on high land; not analysed.	

Seraup 15 ...	20.5	Morak Sepilai 2 ...	21.0
„ 36 ...	22.8	„ 22 ...	23.2
„ 371 ...	22.2	„ 26 ...	23.9
„ 146 ...	23.4	„ 28 ...	21.7
Mayang Kuning 48 ...	24.8	„ Unselected ...	21.2
S.D. = 2.0 M.S.D. = 2.9 lbs.		S.D. = 1.2 M.S.D. = 1.8 lbs.	

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Padang Trengganu 9 ...	19.0	Mayang Sagumpal 2 ...	15.9
„ 11 ...	16.1	„ „ 14 ...	18.4
„ 22 ...	20.2	„ „ 16 ...	19.6
„ 27 ...	17.3	„ „ 33 ...	15.6
„ Unselected	17.3	„ Unselected ...	17.3
S.D. = 1.2 M.S.D. = 1.8 lbs.		S.D. = 1.4 M.S.D. = 2.1 lbs.	

The first two Latin Squares are of 6 months varieties of padi, while the rest are of 7 months varieties. The 6 months varieties, although sown (24th July-11th August) at a reasonable time after the 7 months varieties (3rd July-20th July), again ripened before them and suffered damage from birds. The worst sufferer was Radin China 4, newly introduced from Kedah. Further slight readjustments of sowing dates will be made.

The Experiment Station is on medium heavy clay and Krian-selected Seraups continue to be satisfactory, including the recent introduction Mayang Kuning 48 and Seraups 146 and 371, while Siam 29 is also well suited to Kota Bahru conditions.

Seraup 36 and Siam 29 will be given extensive field trials in all five districts during the 1939-40 season.

Morak Sepilai selections 22 and 26 are quite satisfactory also, while Padang Trengganu 22 remains the best of that variety.

Pure-line Selection.

The following varieties of wet padi were undergoing selection:

Variety	No. of Lines	Selection commenced	Maturation Period in days.
Padang Trengganu ...	4	1934 - 35	214 to 217
Morak Sepilai ...	4	1935 - 36	221 to 223
Mayang Segumpal ...	7	„	217 to 219
Singgora ...	6	„	186 to 193
Anak Naga ...	10	„	186 to 197
Nalong ...	32	1937 - 38	217 to 223
Manek Siam ...	35	„	218 to 221

Padang Trengganu.—There seems little doubt that P.T.22 is the best of the selections for the heavier types of soil. At Kota Bharu, it has headed the lines for two years at over 100 gms. per plant, while it has also yielded best in the Latin Square trials. This strain will be multiplied next season to obtain seed for extended trials on raiats' land in the heavy soil areas. As regards the light soil areas, a Latin Square trial was laid down this season at Pasir Puteh but has been badly damaged by rats. P.T.9, 11 and 27 will be retained as well as 22 until the position at Pasir Puteh is clear.

Morak Sepilai.—From Latin Square trials laid down for the first time this season and from the last two seasons in the lines, it would appear that Mor. S. 22 and 26 are the pick of the four lines remaining, but further confirmation is desirable.

Mayang Segumpal.—The strain M.S.G. 16 has been outstanding for the past two seasons in the lines and also headed the Latin Square trial laid down for the first time this season. The next best is M.S.G. 14. A further season in the Latin Square is desirable to make absolutely certain, but in the meantime M.S.G. 16 can be multiplied with a view to trials by cultivators.

Singgora.—Latin Square trials were laid down for the first time this season but have merely served to complicate matters by giving diametrically opposite results to those obtained in the lines. The four best strains appear to be S.19, 22, 24 and 29 but none of them is outstanding and it may be that this variety, which is not a local but a Siamese one, is not well suited to local conditions. If this is so it is unfortunate as it is a first class type in many ways. Latin Square trials and the four best lines will be continued next season to obtain further information.

Anak Naga.—This variety is proving difficult to select as it appears to be very susceptible to damage by birds, and for the past four seasons the ear-to-row selection work has been complicated and upset by this factor. A Latin Square trial will be laid down next season with Ak.N. 2, 13, 37 and 38 and these strains kept on in the lines with the addition possibly of Ak.N. 1 and 11. Latin Square trials should give a better idea of whether there is anything really outstanding but the general impression is that this variety, although possessing a splendid grain, seldom yields really well in the field.

It is an unfortunate fact that in Kelantan the really adaptable varieties are those possessing grains of moderate or poor type, *e.g.* Manek Siam, Nalong, Padang Trengganu, Mayang Segumpal.

Nalong.—Very good yields were again obtained in the lines, thirteen of which averaged over 100 gms. per plant. At least one more year of elimination in the lines will be necessary before Latin Square trials are begun. Sixteen lines are suggested for retention next season, *viz.* Ng. 10, 15, 17, 22, 28, 29, 30, 32, 33, 34, 41, 42, 44, 45, 46 and 50.

Manek Siam.—Yields were hardly as good as last season. This variety is at the same stage of selection as Nalong and further elimination in the lines will be necessary before Latin Square trials are begun. Fourteen lines are suggested for retention next season, as follows:— Man. Sm. 13, 14, 21, 34, 35, 37, 38, 39, 41. 42, 43, 44, 45 and 46.

Dry-land Padi.

The following varieties of dry-land padi were undergoing selection:—

Variety	No. of Lines	Selection commenced	Maturation Period in days.
Muar Pa'Dok ...	6	1934-35	179 to 183
Padang Serai ...	5	„	174
Sa Bumi Puteh ...	7	„	174
Jintan Koring ...	7	„	179
Kaki Merpati ...	7	„	179 to 183

Muar Pa'Dok.—M.P.D. 5, 26, 28 and 30 seem to be the best lines and will go into a Latin Square trial next season. The remaining lines can safely be discarded.

Padang Serai.—The situation has been complicated rather than clarified by this season's Latin Square trials. These will be repeated next season and only the 4 strains concerned, P.S. 1, 7, 15 and 28, retained in the lines.

Sa Bumi Puteh.—Here again the Latin Square trial has not helped matters and will have to be repeated next season. Only the 4 strains concerned, *viz.* S.B.P. 1, 3, 9 and 11, need to be retained in the lines.

Jintan Koring.—A Latin Square will be made up next season comprising J.K. 7, 8, 21 and 26 and the remainder discarded.

Kaki Merpati.—Latin Square trials can be commenced next season comprising K.M. 2, 5, 31 and 33 and the remaining lines discarded.

Varietal Survey.

The collection and examination of ears of the more important varieties from each *daerah** is being continued. On completion of this it should be possible to indicate which varieties should be concentrated on from the point of view of selection.

Selection will be on the broadest possible basis from the start; re-selection on a wider basis of varieties at present in ear-to-row lines may be necessary; and a multiplicity of varieties undergoing selection at any one time should be avoided.

Pasir Mas Test Station.

The season has again been a poor one owing to lack of early water supply, and it is not worth while giving details of results of experiments as yields were so low as to be of very little value.

* *daerah* = district.

Two seasons' experience at this Station have amply demonstrated the difficulties met with in growing padi on fairly good but rather high-lying land, without irrigation facilities.

Furthermore, the rainfall recorded during the past two years indicates great variation in seasonal fall and distribution. The distribution, too, shows that much of the total rainfall must have been lost in "run-off". For instance, in September 1938 there were over 8 ins. of rainfall, but of this over 5 ins. fell in 3 days at the commencement of the month, and by the 6th October the land had practically dried out. In November 22.9 ins. of rain fell, but over 17 ins. of this fell between the 16th and 21st days of the month.

A number of strains of Radin, Reyong, Siam, Seraup and local varieties were tried this season but the only varieties to yield anything like a reasonable crop were late planted (November) Anak Naga and Anak Ikan.

Anak Ikan is a locally popular late short-term variety of padi, and it is possible that this Station may eventually become the centre for selection work on the late short-term varieties which are of such importance, locally, on account of the large areas of unirrigated high-lying land.

Pasir Puteh Test Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Manek Siam ...	18.2	Padang Trengganu 9 ...	13.8
Nalong ...	13.7	„ 11 ...	11.0
Chantek ...	12.1	„ 22 ...	17.9
Rambutan ...	12.4	„ 27 ...	14.4
Padang Trengganu ...	15.9	„ Unselected	15.8
S.D. = 2.1 M.S.D. = 3.1 lbs.		S.D. = 2.0 M.S.D. = 2.9 lbs.	

Reyong 6 ...	17.8	Padang Trengganu 22	15.0
Siam 29 ...	17.1	Mayang Kuning 48 ...	15.1
Mayang Ebus 80 ...	17.7	Mayang SaBatil 8 ...	13.3
Radin China 4 ...	15.9	Seraup 371 ...	10.8
S.D. = 1.0 M.S.D. = 1.7 lbs.		S.D. = 1.9 M.S.D. = 3.3 lbs.	

Yields are below those of the previous season owing to less favourable weather, with light and unevenly distributed rainfall.

There was considerable rat damage in sub-plots of the Padang Trengganu Latin Square.

The soil of this Station is light and sandy and Mayang SaBatil and Seraup 371, selected in the heavier, well watered soil of Krian, have not done well with the lack of adequate rainfall this season.

Bachok Test Station.

This Test Station is on sandy coastal soil, some 12 miles south-east of Kota Bharu and is entirely dependent on rainfall.

Work at present is being confined to manurial experiments, and this season organic manures and rock phosphate have given significant increases in yields.

Melor Experiment Station.

The new Station will soon be opened to accommodate all dry-land padi experiments and selection work.

BRUNEI AND LABUAN.

Kilanas Experiment Station.

The varietal trials at Kilanas were all sited in an area where a predominance of peaty soil causes poor growth and yield and the poor results of the 1938-39 season are probably representative of the yield of padi possible on soil of this type.

Although the varietal trials' yields were low, there was less pest damage than in previous years and the figures showed a greater degree of uniformity than in previous seasons. Statistical analysis of the results was not justified but the figures again showed that the Seraup strains of padi, as well as Siam 29 and the local variety Jongkok are likely to be the most successful. On the figures recorded it was impossible to say which of the Seraups appeared best at this Station, as the mean yields were all approximately the same (9 lbs. per 1/120th acre).

Arrangements have been made for the varietal trials in future years to be sited on an adjoining area where the soil is much more suitable for wet padi.

Pure-line Selection.

Selection work of local varieties continued as indicated below:—

Variety	Series	Season	Lines under Observation.	Lines Retained
Jongkok ...	1	Third ...	43	39
„ ...	2	First ...	30	28
Radin Pasir ...	1	Third ...	30	28
Arat ...	1	„ ...	11	11
„ ...	2	First ...	20	20
Limbu ...	1	Second ...	23	17
Anusan ...	1	First ...	30	28
Langsat Kuning ...	1	Second ...	17	17
„ „ ...	2	First ...	30	27
Langsat Puteh ...	1	Second ...	12	12

Lumapas Test Station.

Variety	Mean Yield per 1/120th acre in lbs.	Variety	Mean Yield per 1/120th acre in lbs.
Mayang Kuning 48 ...	13.1	Mayang Kuning 48 ...	10.0
Seraup 15 ...	13.3	Seraup 36 ...	10.8
Seraup 48 ...	16.5	„ 146 ...	9.1
„ 146 ...	14.0	„ 371 ...	9.4
Jongkok ...	16.4	Jongkok ...	14.3
By inspection, no significant differences.		By inspection, Jongkok superior to selected strains.	

Jongkok ...	22.3	Milek Kuning 3 ...	16.0
Limbu ...	15.7	Radin 11 ...	14.8
Langsat ...	10.4	„ 13 ...	13.4
Arat ...	10.4	Mayang Ebus 88 ...	14.8
Anusan ...	11.5	„ „ 209 ...	12.4
S.D. = 2.0 M.S.D. = 2.9 lbs.		S.D. = 1.9 M.S.D. = 2.6 lbs.	

There was a great deal of rat damage throughout the season and the Krian Seraup selections and Mayang Kuning 48 have given not nearly as good yields as in previous seasons. The local padi Jongkok shows up very well, also the Pahang variety, Milek Kuning 3.

Kuala Abang Test Station.

Padi plants at this Station also suffered greatly from rat damage, and yields are too low to be worth inclusion here. Siam 29 and Mayang Ebus 88 with yields of 12 lbs. and 11.4 lbs. respectively per 1/120th acre were much the best.

Brunei has only recently begun to change over from dry padi to wet padi planting methods and experimental work is particularly difficult owing to the liability to pest damage.

Berakas Test Station.

This Test Station has now been abandoned, and a new one at Paya Bakong has been commenced in its place.

Bukit Kallam Padi Station (Labuan).

Owing to pest damage yields of sub-plots in the Latin Square varietal trials vary excessively, and the results are of no significance. Siam 29 appeared to be the least affected.

In multiplication plots Milek Puteh 148 gave excellent yields, also Seraup 146 and Siam 29.

Selection work is being carried out on the local varieties Siam, Acheh, Rangoon and Piassau.

SUMMARY.

Kedah.

In contrast with the 1937-38 season the 1938-39 season was a very good one. The season in general was notable for the harvesting of a record crop, while varietal trials at the Test Stations enhanced the reputation of Mayang Ebus 80 as the leading selected strain for average Kedah conditions.

Selection work with selected strains of the varieties Serendah Sungei Dua and Mayang Tekai continues to produce satisfactory results.

It appears to be established that Reyong 20 is very liable to suffer severe rat damage, presumably on account of the succulence of its stems.

Penang.

The local variety Mayang SaBatil continues to be successful.

Province Wellesley.

A good season was experienced. Mayang Ebus 80 and Reyong 6 continue to give satisfactory yields and are gaining in popularity in the Central and Northern Districts. Selection of two local varieties is to be initiated.

In South Province Wellesley, the Sungei Acheh padi-growing area has greatly benefited by its inclusion in the Krian Irrigation Scheme, but the supply of water for this season was somewhat below the optimum.

Perak, Krian District.

A recent selection, Mayang SaBatil 8, has everywhere proved itself very satisfactory as regards yields, and being of a good milling type is regarded as being of much promise. Reports after harvest, however, revealed the fact that it was somewhat difficult to thresh and it may not become popular on this account.

Planting distance experiments are being continued, largely in connexion with a correlation of selection methods and field practice.

Perak (General).

At Bukit Gantang and Bruas, Siam 29, in a season which did not favour early sown Seraups but which was otherwise satisfactory, gave good yields.

At Talang Experiment Station, Mayang Ebus selections were again very good.

At Sungei Manik, Mayang SaBatil 8 and Seraup strains were good, as expected.

Selangor.

Of by far the greatest importance are the progress of the Sungei Tengi Irrigation Scheme in Kuala Selangor and the fact that the Tanjong Karang-Panchang Bedena area of 45,000 acres, which it will serve, is good padi soil and may confidently be expected to give relatively high yields when irrigation water is adequately available.

Negri Sembilan.

A good season was experienced. Adjustment of sowing dates continues, and adjusted sowing dates may have been partly responsible for the greatly improved yields at the Test Stations this season.

Pahang.

There are two chief distinctions in the padi-growing lands of Pahang, namely the irrigated, terraced *sawah* of the Raub and Lipis Districts, and the *paya-paya* or swamps along Pahang River, which have no assured water supply.

The chief work at present in hand is experimentation of optimum sowing dates at the *sawah* Test Stations, Dong and Kuala Lipis, also Sungei Blat and Pahang Tua.

These experiments are being extended to the *paya* Test Stations as observations in conjunction with puddling and other trials in *paya* management.

Malacca.

Selection work and seed distribution remain the most important functions of the Pulau Gadong Experiment Station. Siam 29, Nachin 11 and Milek Putch 9 are the highest yielding and most popular strains.

Shortage of water in the coastal areas of padi land was particularly severe this season, and very low yields were obtained wherever irrigation water was not available.

Insect pests did much damage to late ripening padi.

Kelantan.

The season at Kota Bahru Experiment Station was a satisfactory one, but dry weather, generally, militated against good crops in many padi-growing areas in the State.

A survey of varieties of padi is being continued, and, as a result, selection of the most important wet-land varieties may be recommenced on a wider basis.

Dry-land padi experiments will be separately carried out at a new Experiment Station, and selection of late short-term wet-land varieties may be instituted.

Johore.

A good padi season was experienced. Very satisfactory yields were harvested at Tangkak Test Station, and Siam 29 was the most successful variety at both Tangkak and Jementah.

Local irrigation and drainage schemes are being carried into effect.

Brunei and Labuan.

Damage by pests, chiefly rats, was very considerable this season, and results of varietal trials are of little value. Work at the several Padi Stations is, however, achieving results in the gradually extending area of land being converted to cultivation of wet-land padi.

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PADI MANURIAL AND MINOR CULTURAL TRIALS, SEASONS 1937-1938 AND 1938-1939

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The general position in regard to padi manurial trials from 1930 to 1935 has been previously summarized.* Trials carried out during the 1936-37 season have also been recorded.†

There follows an account of certain trials carried out during the two seasons 1937-38 and 1938-39.

Season 1937 - 1938.

Heavy Phosphate Trials.

The Heavy Superphosphate and Rock Phosphate Dust Trials which were planted for residual effect in the 1936-37 season were examined for further residual effect of the phosphate dressings in combination with heavy dressings of nitrogen.

Nitrogen was applied as ammonium sulphate in three equal applications, 1 week before transplanting, 6 weeks after transplanting and 10 weeks after transplanting. Results are given in Tables I and II.

Table I.

Heavy Superphosphate Residual plus Heavy Nitrogen.

Mean Yield in lbs. per 1/360th acre.

Station	Total Ammonium Sulphate per acre	Superphosphate per acre			
		Nil	16 cwts.	32 cwts.	48 cwts.
	cwts.				
Bagan Serai ...	5	3.8	4.3	5.2	5.5
Kuala Kurau ...	„	5.5	5.3	4.5	5.1
Pulau Gadong ...	„	3.9	3.7	3.7	3.7
Kendong ...	„	1.8	2.0	1.8	2.1
Briah ...	10	3.1	2.7	2.6	2.6
Sungei Kepar ...	„	1.6	1.2	1.1	1.1
Bukit Merah ...	„	1.6	4.7	5.4	4.7
Talang ...	„	9.7	10.5	9.3	8.7
Selinsing ...	15	1.7	1.9	2.3	3.2
Titi Serong ...	„	8.2	8.6	8.4	7.5
Telok Chengai ...	„	6.4	4.9	4.4	4.1

* *Malayan Agricultural Journal,* Vol. XXIV, page 629, December, 1936.
† *Malayan Agricultural Journal,* Vol. XXV, page 525, December, 1937.

Table II.

Heavy Rock Phosphate Residual plus Heavy Nitrogen.

Mean Yield in lbs. per 1/360th acre.

Station	Total Ammonium Sulphate per acre	Rock Phosphate per acre			
		Nil	16 cwts.	32 cwts.	48 cwts.
	cwts.				
Bagan Serai ...	5	3.2	3.7	3.3	3.6
Kuala Kurau ...	„	6.4	6.3	5.9	6.0
Pulau Gadong ...	„	5.1	3.9	4.0	4.6
Kendong ...	„	4.0	3.6	2.5	2.3
Briah ...	10	2.2	2.6	3.4	3.3
Sungei Kepar ...	„	1.8	2.1	1.4	1.6
Bukit Merah ...	„	1.9	4.4	4.7	5.2
Talang ...	„	12.2	11.7	10.7	12.6
Selinsing ...	15	2.4	1.7	1.5	1.2
Titi Serong ...	„	7.8	7.5	7.2	6.7
Telok Chengai ...	„	6.1	5.2	4.7	3.9

A comparison of these tables with those given in previous records* shows that the 1937-38 yields are low. Reports from many Stations, however, indicated considerable damage due to lodging and rats.

Only at Bukit Merah were any significant differences obtained, but the yields of the control plots were so low that the results were regarded with suspicion. It should be noted here, however, that the experiment was repeated in the 1938-39 season and the results obtained confirmed the significant differences shown at this Station.

Insoluble Nitrogen and Phosphate Trials.

These experiments which were initiated in the 1936-37 season† were replanted on the same five Stations for residual effects.

With the exception of Telok Chengai, yields were lower than in the previous season and no significant differences emerged. At Telok Chengai there appeared to be a slight significant residual increase due to nitrogen.

* *Malayan Agricultural Journal*, Vol XXIV, page 622, and Vol. XXV, page 527.

† *Malayan Agricultural Journal*, Vol. XXV, page 526.

Table III.

Insoluble Nitrogen and Phosphate Trials Residual Effects.

Mean Yield in lbs. per 1/360th acre.

Telok Chengai.

Treatment per acre	Rock Phosphate			Mean
	Nil	2 cwts.	5 cwts.	
No nitrogen ...	7.9	8.9	9.2	8.7
11 cwts. ground horn. ...	8.8	9.7	9.6	9.3
22 „ „ „ ...	10.0	9.8	10.5	10.1
Mean ...	8.9	9.5	9.8	9.4

Titi Serong.

No nitrogen ...	6.5	6.2	6.3	6.3
11 cwts. ground horn. ...	6.4	7.0	6.7	6.7
22 „ „ „ ...	6.8	6.5	7.2	6.9
Mean ...	6.6	6.6	6.8	6.6

Talang.

No nitrogen ...	10.8	9.2	8.9	9.6
11 cwts. ground horn. ...	10.0	9.7	9.4	9.7
22 „ „ „ ...	9.6	9.3	10.1	9.6
Mean ...	10.1	9.4	9.5	9.7

Pulau Gadong.

No nitrogen ...	5.7	5.8	5.6	5.7
11 cwts. ground horn. ...	5.6	6.2	5.4	5.8
22 „ „ „ ...	5.2	4.4	5.1	4.9
Mean ...	5.5	5.5	5.3	5.5

Kota Bharu.

Treatment per acre	Rock Phosphate			Mean
	Nil	2 cwts.	5 cwts.	
No nitrogen ...	6.7	6.9	6.8	6.8
11 cwts. ground horn. ...	6.6	6.1	6.5	6.4
22 „ „ „ ...	6.9	6.9	6.8	6.9
Mean ...	6.8	6.6	6.6	6.7

Heavy Green Dressing and Phosphate Trials.

These trials were initiated at six Stations. The lay-out was similar to that of the Insoluble Nitrogen and Phosphate Trial,* with the substitution of 20, 40 and 60 tons of green matter in place of the nitrogen dressings. The green dressings were allowed 1 month to rot down before planting commenced.

It will be seen from Table IV that no effects were evidenced at five out of the six Stations, and at the sixth, Telok Chengai, the green dressings appeared to have a significant depressing effect on yield.

Table IV.

Heavy Green Dressing and Phosphate Trials.

Mean Yield in lbs. per 1/360th acre.

Kota Bharu.

Treatment per acre	Rock Phosphate			Mean
	Nil	2 cwts.	5 cwts.	
20 tons green manure ...	7.9	8.2	8.5	8.2
40 „ „ „ ...	8.3	8.7	7.8	8.3
60 „ „ „ ...	7.4	7.5	7.9	7.6
Mean ...	7.8	8.1	8.1	8.0

Telok Chengai.

20 tons green manure ...	10.4	7.8	9.2	9.2
40 „ „ „ ...	7.4	6.6	5.3	6.3
60 „ „ „ ...	4.4	6.1	4.2	4.9
Mean ...	7.3	6.9	6.3	6.8

* *Malayan Agricultural Journal*, Vol. XXV, page 525.

Pulau Gadong.

Treatment per acre	Rock Phosphate			Mean
	Nil	2 cwts.	5 cwts.	
20 tons green manure ...	6.9	7.6	7.9	7.5
40 „ „ „ ...	7.2	7.9	7.9	7.7
60 „ „ „ ...	6.7	7.2	7.8	7.3
Mean ...	7.0	7.6	7.9	7.5

Briah.

20 tons green manure ...	5.0	4.2	4.6	4.6
40 „ „ „ ...	5.3	4.5	4.9	4.9
60 „ „ „ ...	4.7	4.2	5.0	4.6
Mean ...	5.0	4.3	4.8	4.7

Talang.

20 tons green manure ...	10.3	9.8	9.6	9.9
40 „ „ „ ...	8.3	9.9	9.5	9.2
60 „ „ „ ...	9.6	8.6	9.8	9.3
Mean ...	9.4	9.4	9.6	9.5

Selinsing.

20 tons green manure ...	3.2	4.1	3.7	3.7
40 „ „ „ ...	3.1	3.5	3.3	3.3
60 „ „ „ ...	2.2	2.3	2.3	2.3
Mean ...	2.8	3.3	3.1	3.1

Minor Experiments.

Many minor cultural or manurial experiments were carried out on various Stations. Of these the following showed significant effects or were of particular interest.

At Selinsing the practice of changkolling wet or dry for two seasons showed significant effects over tajaking. The results are shown in Table V.

Table V.
Cultivation Experiment, Selinsing.
Mean yield in lbs. per 1/120th acre.

Treatment	lbs.	
A. Changkol dry 1936-37 ...	10.8	S.D.† = 1.2 lbs. = 10.6%
B. „ „ „ and 1937/38 ...	13.5	of general mean.
C. „ wet „ ...	10.6	M.S.D. = 1.7 lbs.
D. „ „ „ and 1937/38 ...	11.4	
E. Tajak* „ „ „ ...	9.7	
Mean ...	11.2	

At Pulau Gadong an experiment on the period of preparation of the land initiated in 1936-37,‡ was repeated. Results, which are shown in Table VI, were not significant.

Table VI.
Preparation of Land Experiment, Pulau Gadong.
Mean yield in lbs. per 1/100th acre.

Land prepared 4 weeks before planting ...	12.6
„ „ 6 „ „ „ ...	13.9
„ „ 8 „ „ „ ...	12.2
Mean ...	12.9

* Scything weed growth with a local tool called a *tajak*.
† S.D. = Standard Deviation.
M.S.D. = Minimum Significant Difference.
‡ *Malayan Agricultural Journal*, Vol. XXV, page 531.

At Telok Chengai an experiment on the disposal of straw gave no significant results. When phosphate was added after a burn, however, a significant increase was obtained.

Table VII.

Disposal of Straw Experiment, Telok Chengai.

Mean yield in lbs. per 1/45th acre.

Straw removed with stubble ...	69.2	S.D. = 2.7 lbs. = 3.7% of general mean.
Straw burnt ...	73.5	M.S.D. = 4.8 lbs.
Straw spread ...	74.1	
Straw burnt and 250 lbs. guano added ...	77.0	
Mean ...	73.5	

At Titi Serong an experiment on the disposal of straw gave no significant results. The experiment differed from that at Telok Chengai in that the straw was cut only about one third down its length whereas at Telok Chengai it was cut at ground level.

Table VIII.

Disposal of Straw Experiment, Titi Serong.

Mean yield in lbs. per 1/10th acre.

Straw burnt ...	225.5
Straw spread at *menajak** ...	220.9
Straw spread at harvest ...	225.2
Straw removed ...	225.1
Mean ...	224.9

* *Menajak* = clearance of weed growth preparatory to padi planting.

ERRATUM

Malayan Agricultural Journal December, 1938, page 520, before the paragraph commencing "It is noteworthy. . . . . " add

KELANTAN.
Kota Bahru Experiment Station.

At Kota Bharu, a manurial experiment indicated significant responses to added nitrogen.

Table IX.
Manurial Experiment, Kota Bharu.
Mean yield in lbs. per 1/120th acre.

Treatment per acre.	lbs.	
Control	19.2	
2 cwts. ground horn	22.1	S.D. = 1.8 lbs. = 8.2% of general mean.
„ „ „ and 2 cwts. phosphate ...	22.7	M.S.D. = 2.6 lbs.
2 cwts. phosphate and 1½ cwts. ammonium sulphate in two dressings	23.7	I.C.* = 2.1 lbs.
2 cwts. phosphate and legume turned in. ...	20.2	
Mean ...	21.6	

At Pasir Puteh, Kelantan, a manurial experiment, which was damaged by rats, showed no significant results but strong indications that the Station was responsive to manuring.

Table X.
Manurial Experiment, Pasir Puteh.
Mean yield in lbs. per 1/40th acre.

Treatment per acre.	lbs.
Control	47.8
2 cwts. rock phosphate	60.5
„ „ „ and 2 cwts. ground horn	64.7
„ „ „ and green manure	64.6
„ „ „ and 1½ cwts. ammonium sulphate in two dressings	62.0
Mean ...	59.9

*I.C. = Increase over control plot necessary to attain significance.

At Bachok, Kelantan, two manurial experiments carried out indicated that the Station is likely to be responsive to manuring, particularly nitrogen.

Table XI.
Manurial Experiment, Bachok.

Mean yield in lbs. per 1/60th acre.

Treatment per acre		lbs.
1936-37.	1937-38.	
A. ½ cwt. [illegible] phosphate	2 cwts. rock phosphate ...	9.9
B. 1 „ „ „	1 „ „ „ ...	11.6
C. 2 cwts. „ „	Residual ...	14.5
D. Control	Control ...	10.1
	Mean ...	11.5

S.D. = 2.3 lbs. = 20% of general mean.
M.S.D. = 4.0 lbs. I.C. = 3.2 lbs.

Table XII.
Manurial Experiment, Bachok.

Mean yield in lbs. per 1/60th acre.

Treatment per acre		lbs.
1936-37.	1937-38.	
A. Proprietary fertilizer	Control ...	16.1
B. 1 cwt. rock phosphate	2 cwts. rock phosphate ...	17.5
C 1 cwt. superphosphate	5 tons green manure ...	18.9
D. Control	2 cwts. rock phosphate and 1½ cwts. ammonium sulphate	29.6
	Mean ...	20.5

S.D. = 3.4 lbs. = 16.6% of general mean.
M.S.D. = 5.95 lbs.

Season 1938 - 1939.

Heavy Green Dressing and Phosphate Trials.

These trials, initiated the previous season, were replanted for examination of residual effects. Results are given in the following tables, which, compared with those given in Table IV, show great differences in seasonal effects but no effect of the treatments.

Table XIII.

Heavy Green Dressing and Phosphate Trials, Residual.

Mean yield in lbs. per 1/360th acre.

Kota Bharu.

Treatment per acre	Rock Phosphate			Mean
	Nil	2 cwts.	5 cwts.	
20 tons green manure ...	6.6	6.6	6.5	6.6
40 „ „ „ ...	7.2	7.0	7.0	7.1
60 „ „ „ ...	6.4	6.7	6.9	6.7
Mean ...	6.7	6.8	6.8	6.8

Telok Chengai.

20 tons green manure ...	12.6	12.3	13.1	12.7
40 „ „ „ ...	13.8	14.3	14.3	14.1
60 „ „ „ ...	13.6	12.9	12.3	13.0
Mean ...	13.4	13.2	13.3	13.3

Pulau Gadong.

20 tons green manure ...	5.8	6.2	5.9	6.0
40 „ „ „ ...	5.8	5.9	6.0	5.9
60 „ „ „ ...	5.7	6.3	6.1	6.1
Mean ...	5.8	6.1	6.0	6.0

Briah.

Treatment per acre	Rock Phosphate			Mean
	Nil	2 cwts.	5 cwts	
20 tons green manure ...	6.2	5.5	5.8	5.8
40 „ „ „ ...	6.3	5.9	5.2	5.8
60 „ „ „ ...	6.0	6.1	6.0	6.0
Mean ...	6.2	5.8	5.7	5.9

Talang.

20 tons green manure ...	7.8	9.9	9.5	9.1
40 „ „ „ ...	9.1	9.4	10.1	9.5
60 „ „ „ ...	7.6	9.1	10.8	9.2
Mean ...	8.2	9.5	10.2	9.3

Minor Experiments.

Other experiments carried out during the season were either special experiments designed for certain Stations or minor cultural trials.

At Pulau Gadong two experiments were of interest; the cultivation experiment carried out the previous year (Table VI) was repeated with the following result.

Table XIV.
Cultivation Experiment, Pulau Gadong.

Mean yield in lbs. per 1/100th acre.

Land prepared 4 weeks before planting ...	20.4
„ „ 6 „ „ „ ...	19.7
„ „ 8 „ „ „ ...	19.0
Mean ...	19.7

The differences are not statistically significant.

The second experiment was designed to test the effect of running off water during growth, in combination with the application of manures at such times. The lay-out was 1/120th acre strips replicated three times with the following treatments:

A. Control, no manures applied, water left on the whole season.
B. Control, no manures applied, water run off early and late during the growing season.
C. Nitrogen and phosphate dressings applied before planting, water left on the whole season.
D. Nitrogen and phosphate dressings applied before planting, water run off early and late during the growing season.
E. Nitrogen and phosphate dressings applied before planting, and early and late during the growing season at the same time as the water was run off.

Nitrogen dressings totalled 1½ cwts. of ammonium sulphate per acre, and phosphate dressings 2 cwts. of rock phosphate per acre.

The results obtained are shown in Table XV.

Table XV.
Pulau Gadong.
Mean yield in lbs. per 1/360th acre.

Treatment	lbs.
A ...	19.2
B ...	18.6
C ...	18.8
D ...	18.5
E ...	17.7
Mean ...	18.6

At Telok Chengai the continued experiment on the method of disposal of straw almost attained statistical significance (*cf.* Table VII).

Table XVI.
Disposal of Straw Experiment, Telok Chengai.
Mean yield in lbs. per 1/45th acre.

Straw removed with stubble	68.8	S.D. = 4.45 lbs. = 6% of general mean.
Straw burnt	75.2	M.S.D. = 7.75 lbs.
Straw spread	75.5	
Straw burnt and 250 lbs. guano added ...	77.0	
Mean ...	74.1	

A statistical analysis of the combined results obtained from this experiment over the last three seasons showed, however, that the removal of the straw had had a definite depressing effect on yield.

At Selinsing the cultivation experiment referred to previously (Table V) was continued for residual effects, all plots being tajaked during this season. Results are given in Table XVII showing the significant residual effect of two seasons' changkolling (Treatments B and D).

Table XVII.

Cultivation Experiment, Selinsing.

Mean yield in lbs. per 1/120th acre.

Treatment per acre		lbs.	
A	Tajaked ...	12.3	
B	„ ...	13.7	S.D. = 0.65 lb. = 5.1% of general mean.
C	„ ...	12.5	M.S.D. = 0.95 lb.
D	„ ...	13.4	
E	„ ...	11.7	
	Mean ...	12.7	

At Kota Bharu, Kelantan, significant results were obtained in two experiments with wet pedi and two experiments with dry padi.

Table XVIII.

Manurial Experiment, Kota Bharu.

Mean yield in lbs. per 1/120th acre.

Treatment per acre	lbs.
½ cwt. rock phosphate + ½ cwt. ammonium sulphate in two dressings ...	22.1
1 „ „ „ + 1 „ „ „ „	23.5
1½ cwts. „ „ + 1½ „ „ „ „	23.0
Control — no manure	21.6
Mean ...	22.6

S.D. = 0.65 lb. = 2.9% of general mean.
M.S.D. = 1.14 lb. I.C. = 0.9 lb.

Table XIX.

Bat Guano Experiment, Kota Bharu.

Mean yield in lbs. per 1/120th acre.

Treatment per acre	lbs.
1 cwt. bat guano ...	17.0
2 cwts. „ „ ...	17.6
3 „ „ „ ...	17.9
Control — no manure ...	15.7
Mean ...	17.05

S.D. = 0.88 lb. = 5.2% of general mean.
M.S.D. = 1.54 lbs. I.C. = 1.2 lbs.

Table XX.

Dry Padi Cultivation and Manurial Experiment, Kota Bharu.

Mean yield in lbs. per 1/120th acre.

Control — no treatment ...	6.7	
Deep late changkol ...	11.2	
Added legume and phosphate ...	7.0	S.D. = 1.24 lbs. = 13.4% of general mean.
Deep late changkol and added legume and phosphate ...	12.0	M.S.D. = 2.16 lbs. I.C. = 1.70 lbs.
Mean ...	9.2	

This experiment showed a very high significant effect of changkolling. The influence of changkolling is also shown in the following experiment.

Table XXI.

Dry Padi Cultivation Experiment, Kota Bharu.

Mean yield in lbs. per 1/80th acre.

Treatment			lbs.
1936.	1937.	1938.	
Changkol early	Plough and harrow	Plough and harrow ...	6.6
Changkol late	-do-	-do- ...	5.7
Plough and harrow	-do-	-do- ...	4.7
Changkol late	Changkol late	-do- ...	8.7
Changkol early	Changkol early	-do- ...	8.2
		Mean ...	6.8

S.D. = 1.4 lbs. = 20% of general mean.
M.S.D. = 2.0 lbs.

At Bachok, Kelantan, significant results were obtained in two manurial experiments.

Table XXII.

Manurial Experiment, Bachok.

Mean yield in lbs. per 1/60th acre.

Treatment per acre	lbs.	
Control	23.8	
2 cwts. rock phosphate	31.2	
5 tons green manure	32.5	S.D. = 2.07 lbs. = 6.8% of general mean.
2 cwts. rock phosphate + 1½ cwts. ammonium sulphate in two dressings ...	34.1	M.S.D. = 3.6 lbs.
Mean ...	30.5	

Table XXIII.
Manurial Experiment, Bachok.

Mean yield in lbs. per 1/60th acre.

Treatment per acre.	lbs.	
Control	21.6	
3 tons bush loppings	28.7	
3 tons compost	30.4	S.D. = 2.07 lbs. = 7.1% of general mean.
2 tons cattle manure	35.1	M.S.D. = 3.6 lbs.
Mean ...	28.9	

Table XXIV.
Manurial Experiment, Pasir Puteh.

Mean yield in lbs. per 1/40th acre.

Treatment per acre.	lbs.
Control	40.8
2 cwts. rock phosphate	47.6
„ „ + 2 cwts. ground horn	53.6
„ „ + 5 tons green manure	51.8
„ „ + 1½ cwts. ammonium sulphate in two dressings ...	51.3
Mean ...	49.0

S.D. = 4.0 lbs. = 8.15% of general mean.
M.S.D. = 5.16 lbs.

This experiment which was a repetition of that carried out in the previous season (Table X), showed that the earlier conclusion then made was correct.

Summary.

After nine seasons' experimental work on the manuring of padi in Malaya, the amount of positive information gained is small, the amount of negative information great.

A study of the results of the experiments published from time to time in this Journal will show that the subject has had exhaustive treatment.

Experiments have covered all types of artificial manuring in varying quantity, organic manuring, methods of cultivation of the land and many combinations of these factors.

From the mass of accumulated data one fact is certain and two general conclusions seem justified. The fact is that as yet we have no indication of the nature of the factor which apparently limits the yield of padi in this country; the first conclusion reached is that the padi soils of the western side of the Peninsula are only slightly responsive to manuring, such response as there is being mainly to phosphate manures, and the increases which can be obtained are not economic; the second conclusion is that excellent response to manuring can be obtained on Kelantan padi soil, nitrogen, as well as phosphate, having a marked effect.

It would now appear that the immediate limit of usefulness of field manurial experiments to raise the yield of the western padi soils has been reached. It would, therefore, seem opportune to discontinue such experiments until further work has suggested new lines of attack on the problem.

Much, however, can be done on the eastern padi soils in determining the most suitable and economic fertilizer dressings for the different districts.

Received for publication 28th November, 1939.

Departmental.

FROM THE DISTRICTS.

Compiled in the Office of the Chief Field Officer from Monthly Reports of Agricultural Officers.

November, 1939.

The Weather.

In Kedah, North Perak and Penang heavy rain occurred and the total precipitation for the month was up to normal. In other parts of the country, although there were adequate falls in most places, the total rainfall for the month was rather below the average.

Crop Reports.

Rubber.—Prices continued to rise during November; in most places the price of best quality sheet touched $50 per picul, and at centres such as Penang and Singapore was even higher. There have been severe outbreaks of mouldy rot disease in most places; this is only to be expected as a result of the combination of wet weather and increased tapping.

All classes of rubber producers are experiencing great difficulty in obtaining supplies of coagulants. Supplies of formic and acetic acids are at the moment short. Assistance has been given by Departmental Officers to small-holders to obtain supplies.

Fermented coconut milk makes a satisfactory coagulant and the Rubber Research Institute have carried out experiments on how best it can be used for this purpose and are preparing a pamphlet of instructions which will be available shortly for the guidance of small-holders and others.

Padi.—Reports generally indicate that prospects for a good harvest are favourable. In response to the country's need for foodstuffs padi cultivators have made special efforts to plant up an increased area of land. In all districts there appears to have been an increase in the total acreage under cultivation.

Conditions in Malacca continue to be difficult. In the coastal areas the first part of the month was very dry which set back the late-planted padi.

A considerable acreage in Malacca was destroyed in the October floods. This was the last of a series of set-backs that have occurred. In the ordinary course of events cultivators would have given up trying to get a crop this season. However, the Collector of Land Revenue and the Agricultural Officer made every effort to get the vacant areas planted up again; 100,000 bundles of surplus seedlings were collected from more distant places, which had not been affected by the flood, and were distributed to cultivators. In this way 300 acres were replanted.

In Stage IV at Sungei Manik, work on felling is about to begin. A village has been established on the northern boundary and accommodation has been provided for a labour force of some 1,000 men: 160 settler-labourers have already entered the area and more will follow shortly. By the end of October a total of 740 lots out of 1,376 had been taken up.

In Pahang, prospects for a good harvest are quite bright. Here and there reaping has already commenced and harvesting will soon be in full swing. Operations are well advanced this season and if all goes well the crop will have been safely harvested before the December floods.

Coconuts.—Copra prices increased considerably and at the end of the month stood at about $5 per picul, though prices as high as $5.60 are quoted.

Work on coconut holdings is being renewed and kilns which have been out of use for a long time are being worked again.

Fruit.—The yield of bananas in Negri Sembilan in November was more than twice that for the previous two months. A heavy crop is also being harvested in Bentong and Manchis with the result that at the moment the market is glutted and prices have fallen. Banana growers in Negri Sembilan are doing a good business in supplying suckers to estates where areas of food crops are being planted. The Department has arranged the supply of some 8,000 suckers to Selangor estates from this source.

Pineapple factories were unable to work continuously during November as only a limited supply of fruit was available.

In Perak, budding of fruit trees in the field has been done by Departmental Officers on an orchard recently planted by a Malay. Out of 64 seedlings dealt with 45 had taken and had made good growth when inspected at the end of the month. In cases of this sort a charge of 25 cents is made for each seedling successfully budded by the Departmental Officer or workman. In the particular case instanced the owner of the orchard has benefited from what he has seen and has budded a number of seedlings for himself. While promiscuous budding for themselves by small-holders may not be altogether a wise thing to advocate, under circumstances such as those mentioned it is obviously a useful adjunct to the supply of budded plants from Agricultural Stations in effecting improvement in the quality of fruit grown in small holdings. It is reported that in the Krian and North Circles of Perak much interest in budding has been evinced recently; there is a keen demand for budded plants from Selama Agricultural Station as well as requests from small-holders for the budding of seedlings growing on their lands.

Penang Hill Land.

The work of examining and gazetting areas in Penang as "hill land" in accordance with the Hill Lands Ordinance is proceeding. The second lot of hill land areas has now been gazetted; 43 out of 104 cultivators in this area will have to cease short term cultivation. Every endeavour is being made to find alternative flat land for squatters who, as a result of the operation of this Ordinance, will be prevented from continuing cultivation.

Pig Breeding Station, Malacca.

A suitable location for the new Pig-Breeding Station has now been selected. The site is 3 acres in extent and is situated just outside Malacca town near the Pulau Gadong Padi Experiment Station. It is easy of access and while being well placed as regards the local Chinese pig-breeders, it will not be objectionable to the local Malay population.

During the month work on preparing the site and erecting building and fencing has gone forward. Progress has been delayed owing to the difficulty in obtaining supplies of building materials.

It is hoped shortly to make a start with 2 gilts from the Agricultural Station, Province Wellesley, and a boar from Cameron Highlands.

Giant Snails.

The following is an extract from a report by the Agricultural Assistant, Pasir Puteh, Kelantan:—

> "Several peasants from the inland who had never seen these snails came to Cherang Ruku and took some specimens for the purpose of breeding them, saying that they looked very beautiful!"

FERTILIZER PRICES, DECEMBER, 1939.

The following are the prices current for the month of December, 1939, of some of the more important fertilizers.

Product.	Analysis				Price per ton $
	Nitrogen (N)	Phosphoric Acid (P_2O_5)		Potash (K_2O)	
		Soluble	Insoluble		
Sulphate of Ammonia ...	20.6	—	—	—	86.00
Calcium Cyanamide ...	20.6	—	—	—	120.00
Muriate of Potash ...	—	—	—	50	144.00
Sulphate of Potash ...	—	—	—	48	120.00
Superphosphate (concentrated) ...	—	39	—	—	120.00
Superphosphate ...	—	16-18	—	—	65.00
Basic Slag ...	—	16*	—	—	66.00
Rock Phosphate (Christmas Island) ...	—	11*	38‡	—	33.50¶
Rock Phosphate (very finely ground Gafsa) ...	—	11*	26 - 28‡	—	40.00
Lime ...	—	—	—	—	20.00

* Citric soluble. ‡ Total ¶ $31.50 per ton *ex* warehouse, Singapore.

Quotations are *ex* warehouse, Port Swettenham, Klang, Singapore and Penang, with the exception of muriate of potash which is *ex* warehouse, Port Swettenham, Klang and Singapore.

Statistical.

MARKET PRICES.

November 1939.

Major Crops.

Rubber.—The market was again notable for considerable fluctuation in quotations and also for a substantial improvement in values. No. 1. X. Ribbed Smoked Sheet opened in Singapore at 38⅜ cents per lb., weakened to 37⅞ cents on the 3rd November, and rose to 39⅛ cents on the 11th; it then fell again to 38¼ cents on the 17th, improved steadily to 40⅜ cents on the 25th, weakening once more to close at 39 cents.

The average of daily quotations for the month was 39.02 cents per lb., as compared with 35.88 cents in October. The London average price was 11.25 pence per lb., and New York 20.01 cents gold, as compared with 10.16 pence and 19.68 cents gold respectively in October.

Prices paid for small-holders' rubber at three centres during the month are given in Table I.

Table I.

Weekly Prices Paid by Local Dealers for Small-Holders' Rubber, November, 1939.

(Dollars per picul of 133 1/3 lbs.)

Grades	Kuala Kangsar, Perak	Kuala Pilah, Negri Sembilan				Batu Pahat, Johore.			
	22	2	9	16	23	1	8	15	22
Smoked sheet ...	47.00	—	47.50	47.00	49.00	45.90	—	44.50	47.50
Unsmoked sheet ...	—	45.00	—	—	—	43.94	45.00	—	46.24
Scrap ...	—	—	—	—	—	—	—	—	—

Transport by F.M.S.R. lorry service Kuala Pilah to Seremban 12 cents per picul, to Malacca excluding duty, 25 cents per picul, by rail Seremban to Penang $1.24 per picul, Seremban to Singapore $8 per ton.

Transport from Batu Pahat to Singapore by lorry, excluding duty, 90 cents per picul.

Transport from Kuala Kangsar to Prai by railway $6.20 per ton.

Transport from Kuala Kangsar to Singapore by railway $10 per ton (minimum consignment 5 tons).

At Kuala Pilah the standard deduction for moisture in unsmoked sheet is 5 per cent.

No purchases of rubber at Kuala Kangsar on the 1st, 8th, 15th and 29th November, at Batu Pahat on the 29th, and at Kuala Pilah on the 30th November.

Palm Oil.—According to *The Oil and Colour Trades, Journal,* 3rd November, 1939, prices for materials allocated to trade consumers were announced by the Ministry of Food in the United Kingdom for the period 29th October to 25th November 1939. The prices of palm oil per ton in this list are as follows:—

£17.15 c.i.f. in casks to be returned.
£17. 5 c.i.f. in loan drums.
£16. 5 c.i.f. in bulk. (S.O.G.P.A. Contract No. 21 Allowances).
£27 refined deodorized naked *ex* works.

Local sales of palm oil (5 per cent. f.f.a.), in sellers' drums, were made in November at $160 to $170 per ton f.o.b. Port Swettenham and $160 f.o.b. Singapore.

Copra.—There was a considerable improvement in the copra market during November. The sun-dried grade opened in Singapore at $3.50 per picul and improved steadily throughout the month to close at $4.60 on a rising market. The Singapore average price for the month was $3.89 per picul as compared with $3.52 in October. The mixed grade continued 30 cents per picul lower than the sun-dried grade.

Copra cake remained unchanged at $2 per picul.

Rice.—The Singapore average wholesale prices of rice per picul in September were as follows:—Siam No. 2 Ordinary $4.12, Rangoon No. 1 $4.12, Saigon No. 1 $3.72, as compared with $3.72, $3.55 and $3.25 in August, and with $4.46, $3.85 and $4.10 in September 1938.

The average retail prices in cents per gantang (gallon) of No. 2 Siam rice were:—Singapore 29, Penang 30, Malacca 30, as compared with 24, 30 and 28 in August.

The average declared trade value of imports during September was $3.81 per picul, as compared with $3.54 in August and $3.66 in July.

Padi.—The Government Rice Mills, Perak and Pahang, continued to pay $2.20 per picul for padi, with a bonus of 10 cents per picul for pure strain S.K. 48 padi in the case of the Perak mills. Privately-owned mills in Kedah were reported to be paying $2 to $2.05.

Retail prices of padi per 100 gantangs (gallons) were as follows:—Province Wellesley and Penang $9.45, Perak $9 to $12, Selangor $10 to $15, Pahang $8 to $15, Pahang $8 to $14, Negri Sembilan $8 to $10, Johore $9 to $16, Kelantan $10, Labuan $12, Brunei $10 to $13 (Belait $16 to $18).

Pineapples.—Prices of canned pineapples were again raised by the Central Board of Packers. The latest prices, per case of 48 cans of 1½ lbs. each, are as follows:—G.A.Q.: Sliced Flat $4.80, Sliced Tall $4.95, Cubes $4.85; Golden: $5.40, $5.55 and $5.45. Average prices for the month were:—G.A.Q.: $4.50, $4.65 and $4.55; Golden: $5.10, $5.25 and $5.15.

Fresh fruit prices per 100 in Selangor were 56 cents to $1.81, and in Singapore $2.

Beverages.

Tea.—No London prices are available.

The latest Colombo prices available, quoted from The *Ceylon Tea Market Report* of 21st November 1939, of the Colombo Brokers' Association, are as follows, in rupee cents per lb.:—High Grown Rs. 1.13, Medium Grown Rs. 1.02, Low Grown 97.

Coffee.—Liberian coffee opened in Singapore at $15 per picul and improved to $16. Excelsa improved from $10.50 to $13.50, and Robusta rose from $7.50 to $8.

The average of highest and lowest quotations in Singapore for Palembang coffee was $11.20 to $13.15 per picul, and for Sourabaya coffee $13.60 to $15.80. The October averages were $13.19 to $14.19 and $10.19 to $11.19 respectively.

Spices.

Arecanuts.—The Singapore Chamber of Commerce quotations per picul, which were stated to be approximate only, were:—Best $5.56, Medium $5.31, Mixed $5.06.

The averages of the highest and lowest quotations per picul in Singapore were as follows:—Splits $11.10 to $13.20, Red Whole $5.15 to $7; Sliced $4.95 to $7.17, as compared with $4.56 to $6.62, $5.12 to $6.56, and $9.19 to $13.38 in October.

Pepper.—There was some improvement in prices during the month. Singapore Black averaged $8.19 per picul. Singapore White rose to $15, averaging $14.66. Muntok White rose to $18, averaging $15.88. The October average prices per picul were $8.25, $14.25 and $14.62 respectively.

Nutmegs.—There was no change in this market, 110's being quoted throughout the month at $32 per picul, and 80's at $40.

Penang dried nutmegs were sold at $18 per picul.

Mace.—No Singapore quotations are available. Locally produced mace, dry, was sold in Penang at $80 per picul.

Cloves.—No Singapore quotations are available. Penang cloves, dried, sold in Penang at $55 per picul.

Cardamoms.—Green cardamoms were quoted in *The Ceylon Chamber of Commerce Weekly Report* of 27th November 1939, from Rs. 1.50 to Rs. 1.65 per lb.

Miscellaneous.

Derris.—More root was available during November and prices continued to improve. It is believed that considerable stocks are held in the main consuming countries for next year's requirements and prices may therefore ease shortly.

Average prices per picul in Singapore for November were as follows:—$10 to $11 for roots sold on a basis of ether extract; $22 to $24 for roots sold on rotenone content. The October averages were $9 to $10 and $20 to $22 per picul respectively.

Gambier.—Block was not quoted, and Cube No. 1 weakened to $15.50, averaging $16.25 per picul for the month.

Sago.—Prices rose again in Singapore during November. Pearl improved from $8.25 to $10, averaging $9.12 per picul, and Flour, Sarawak Fair, rose from $5.50 to $6.50, averaging $6.06 per picul. The October average prices were $8.12 and $5.81 respectively.

Tapioca.—There were further slight rises in this market in Singapore. Flake Fair rose to $9.50, averaging $9.12 per picul; Seed Pearl and Medium Pearl rose from $9 to $10, averaging $9.50. In October all grades averaged $8.62 per picul.

Tobacco.—In Kelantan prepared tobacco continued to be sold at the October prices: 1st quality $85 to $170 per picul, 2nd quality $60 to $135, 3rd quality $40 to $115. Prices of dried leaf per picul were:—Perak 1st quality $40 to $42, 2nd quality $30 to $35, 3rd quality $12 to $30; Negri Sembilan $15 to $30, $12 to $25, $6 to $15; Pahang $20 to $30, $10 to $23, $5 to $18. In Kedah 1st quality tobacco was $34 to $36. In Province Wellesley and Penang 1st quality was $33, and 2nd quality $23. In Selangor cut tobacco was 50 to 70 cents per kati. In Johore, cured leaf prices ranged from $11.50 to $48 per picul, and prepared tobacco prices from $36 to $144 per picul.

The above prices are based on London and Singapore daily quotations for rubber, on the Singapore daily prices for copra, on the Singapore Chamber of Commerce Weekly Reports for the month and on other local sources of information. Palm oil reports and certain coffee prices are kindly supplied by Guthrie & Co. Ltd., Kuala Lumpur, local palm oil prices by Whittall & Co., Kuala Lumpur, the Singapore prices of imported coffee and arecanuts by Lianqui Trading Company of Singapore, and Singapore derris prices by Hooglandt & Co., Singapore.

1 picul = 133 1/3 lbs. The dollar is fixed at two shillings and four pence.

Note.—The Department of Agriculture will be pleased to assist planters in finding a market for agricultural produce. Similar assistance is also offered by the Malayan Information Agency, 57, Trafalgar Square, London, W.C.2.

MALAYAN PRODUCTION OF PALM OIL AND KERNELS

(In long tons, as declared by Estates).

Month 1939	Palm Oil			Palm Kernels		
	F.M.S.	U.M.S.	Malaya	F.M.S.	U.M.S.	Malaya
January ...	2,402.5	2,726.3	5,128.8	429.7	502.0	931.7
February ...	2,193.4	1,693.3	3,886.7	372.9	282.0	654.9
March ...	2,453.1	2,324.8	4,777.9	437.9	394.0	831.9
April ...	2,160.5	2,082.2	4,242.7	423.4	346.0	769.4
May ...	2,066.0	1,760.1	3,826.1	403.1	274.1	677.2
June ...	2,204.8	2,030.2	4,235.0	368.9	318.0	686.9
July ...	2,522.8	2,360.9	4,883.7	437.0	353.0	790.0
August ...	3,613.2	3,004.2	6,617.4	680.8	554.0	1,234.8
September ...	3,260.9	1,625.8	4,886.7	651.2	276.0	927.2
October ...	2,624.5	2,062.2	4,686.7	552.4	326.0	878.4
Total ...	25,501.7	21,670.0	47,171.7	4,757.3	3,625.1	8,382.4
Total January to October, 1938 ...	24,238.3	17,761.7	42,000.0	4,258.2	2,901.0	7,159.2
Total for the year 1938 ...	28,979.0	22,087.7	51,066.7	5,158.9	3,620.0	8,778.9

Stocks on estates as at 31st October, 1939, were : palm oil 1,778 tons, palm kernels 1,675 tons.

ACREAGES OF TAPPABLE RUBBER ACTUALLY TAPPED AND NOT TAPPED ON ESTATES OF 100 ACRES AND OVER, FOR THE MONTH ENDING 31ST OCTOBER, 1939.

STATE OR TERRITORY	Estimated Acreages of Tappable Rubber (9)+(11)	ACREAGES OF TAPPABLE RUBBER NOT TAPPED				Area of tappable rubber never been tapped (b)		Total area not tapped (3)+(5) (c)		TOTAL AREA TAPPED DURING THE MONTH		Area of tappable rubber rested under rotational systems (c)	
		On estates which have entirely ceased tapping		On estates which have partly ceased tapping (a)									
		Acreage	Percentage of (3) to (2)	Acreage	Percentage of (5) to (2)	Acreage	Percentage of (7) to (2)	Acreage	Percentage of (9) to (2)	Average	Percentage of (11) to (2)	Acreage	Percentage of (13) to (2)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
S. S.—													
Province Wellesley ..	42,964	559	1.3	10,754	25.0	507	1.2	11,313	26.3	31,651	73.7	8,195	19.1
Malacca ..	117,580	1,565	1.3	26,495	22.6	1,994	1.7	28,060	23.9	89,520	76.1	26,436	22.5
Penang ..	2,549	nil	nil	1,057	41.5	35	1.4	1,057	41.5	1,492	58.5	60	2.4
Singapore ..	31,973	4,980	15.6	8,007	25.0	275	0.9	12,987	40.6	18,986	59.4	3,303	10.3
Total S.S. ...	195,066	7,104	3.6	46,313	23.8	2,811	1.4	53,417	27.4	141,649	72.6	37,994	19.5
F. M. S.—													
Perak ...	283,746	7,753	2.7	55,092	19.4	6,885	2.4	62,845	22.1	220,901	77.9	43,954	15.5
Selangor ...	315,241	4,711	1.5	50,604	16.0	6,763	2.1	55,315	17.5	259,926	82.5	50,267	15.9
Negri Sembilan ...	261,627	8,457	3.3	56,584	21.6	11,328	4.3	65,041	24.9	196,586	75.1	38,772	14.8
Pahang ...	85,306	3,189	3.8	19,983	23.4	4,942	5.8	23,172	27.2	62,134	72.8	8,628	10.1
Total F.M.S. ...	945,920	24,110	2.5	182,263	19.3	29,918	3.2	206,373	21.8	739,547	78.2	141,621	15.0
U. M. S.—													
Johore ...	477,730	11,979	2.5	115,516	24.2	34,468	7.2	127,495	26.7	350,235	73.3	61,677	12.9
Kedah ...	198,960	7,854	4.0	21,184	10.6	6,220	3.1	29,038	14.6	169,922	85.4	39,290	19.7
Kelantan ...	31,235	403	1.3	6,802	21.8	2,196	7.0	7,205	23.1	24,030	76.9	5,418	17.3
Trengganu (d) ...	4,817	nil	nil	40	0.8	nil	nil	40	0.8	4,777	99.2	2,301	47.8
Perlis (e) ...	1,459	335	23.0	271	18.5	147	10.1	606	41.5	853	58.5	224	15.4
Brunei ...	5,980	nil	nil	1,625	27.2	260	4.3	1,625	27.2	4,355	72.8	1,324	22.1
Total U.M.S. ...	720,181	20,571	2.9	145,438	20.2	43,291	6.0	166,009	23.1	554,172	76.9	110,234	15.3
Total MALAYA ...	1,861,167	51,785	2.8	374,014	20.1	76,020	4.1	425,799	22.9	1,435,368	77.1	289,849	15.6

Notes.—(*a*) Area out-of-tapping on estates which have partly ceased tapping refers to areas definitely being rested and excludes areas on any tapping round.

(*b*) The acreage shown in column (7) is included in columns (3) and (5).

(*c*) Areas of tappable rubber rested under rotational systems are not considered as out-of-tapping and therefore columns (11) and (12) include columns (13) and (14) respectively.

(*d*) Registered companies only.

ACREAGE, STOCKS, PRODUCTION, IMPORTS AND EXPORTS OF RUBBER, INCLUDING LATEX, CONCENTRATED LATEX AND REVERTEX, FOR THE MONTH OF OCTOBER, 1939, IN DRY TONS.

State or Territory	Stocks at beginning of month 1			Production by Estates of 100 acres and over		Production by Estates of less than 100 acres estimated 2		Imports				Exports including re-exports				Stocks at end of month			Consumption 3	
								during the month		January to Oct. 1939		during the month		January to Oct. 1939						
	Ports	Dealers	Estates of 100 acres and over	during the month	Jan. to Oct. 1939	during the month	Jan. to Oct. 1939	Foreign	From Malay States & Labuan	Foreign	From Malay States & Labuan	Foreign	Local	Foreign	Local	Ports	Dealers	Estates of 100 acres and over	during the month	Jan. to Oct. 1939
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
MALAY STATES :—																				
Federated Malay States ...	...	5,916	23,368	12,574	101,881	8,298	47,503	Nil	Nil	Nil	Nil	19,715	5,337	121,138	34,609	...	5,423	19,663	18	182
Johore ...	...	2,833	7,993	5,533	44,542	5,762	31,187	Nil	74	Nil	559	3,646	9,175	27,056	52,041	...	2,307	7,067	...	...
Kedah ...	...	490	4,913	2,894	25,302	1,561	8,010	Nil	Nil	Nil	Nil	2,104	2,923	15,569	18,946	...	361	4,470	...	...
Perlis ...	...	11	17	21	111	46	215	Nil	Nil	Nil	Nil	Nil	46	Nil	320	...	27	22	...	...
Kelantan ...	...	359	662	380	3,272	1,325	6,190	Nil	Nil	Nil	Nil	162	1,463	2,560	6,889	...	505	596	...	...
Trengganu ...	...	43	293	156	1,363	409	2,363	Nil	Nil	Nil	Nil	Nil	599	Nil	3,764	...	33	269	...	...
Brunei ...	...	Nil	72	61	412	79	576	...	...	...	...	...	113	...	989	...	14	85	...	...
Total Malay States	...	9,652	37,318	21,619	176,883	17,480	96,044	Nil	74	Nil	559	25,627	19,656	166,323	117,558	...	8,670	32,172	18	182
S. SETTLEMENTS :—																				
Malacca ...	...	1,619	1,886	1,196	9,640	893	5,379	Nil		Nil		3,194		22,018		...	1,786	1,752	...	...
Province Wellesley	...	1,084	974	504	3,867	228	1,654	Nil		Nil		9,014		62,252		...	671	951	...	...
Penang ...	2,137	2,071	13	17	163	89	690	1,731	22,189	24,454	116,278		Nil		Nil	1,562	2,144	15	...	...
Singapore ...	6,960	12,314	198	151	1,098	84	559	19,694		130,741		33,004		211,887		6,030	15,662	231	18	245
Labuan ...	...	11	Nil	Nil	Nil	22	99	68		520		Nil		Nil		...	16	Nil	...	...
Total Straits Settlements ...	9,097	17,099	3,071	1,868	14,768	1,316	8,381	21,493	22,189	155,715	116,278	45,212	Nil	296,157	Nil	7,592	20,279	2,949	18	245
Total Malaya ...	9,097	26,751	40,389	23,487	191,651	18,796	104,425	21,493	22,263	155,715	116,837	70,839	19,656	462,480	117,558	7,592	28,949	35,121	36	427

TABLE II
DEALERS' STOCKS, IN DRY TONS 3

Class of Rubber	Federated Malay States	S'pore	Penang	Province We'sly D'dings M'cca.	Johore	Kedah
22	23	24	25	26	27	28
DRY RUBBER	4,483	14,732	1,794	2,208	1,967	199
WET RUBBER	940	930	350	279	340	162
TOTAL ...	5,423	15,662	2,144	2,487	2,307	361

TABLE III
FOREIGN EXPORTS

PORTS	For month	Jan. to Oct. 1939
29	30	31
Singapore ...	50,542	319,277
Penang ...	14,000	96,159
Port Swettenham.	6,297	46,100
Malacca ...	Nil	944
MALAYA ...	70,839	462,480

TABLE IV
DOMESTIC EXPORTS 4

AREA	For month	Jan. to Oct. 1939
32	33	34
Malay States ...	45,198	283,196
Straits Settlements	2,962	22,719
MALAYA ...	48,160	305,915

Notes:—

1. Stocks on estates of less than 100 acres and stocks in transit on rail, road or local steamer are not ascertained
2. The production of estates of less than 100 acres is estimated from the formula: Production + Imports + Stocks at beginning of month = Exports + Stocks at end of month. + Consumption, *i.e.*, Column [7] = Columns [13] + [14] + [17] + [18] + [19] + [20] − [2] − [3] − [4] − [5] − [9] − [10]. For the Straits Settlements the production of estates of less than 100 acres is represented by sales or exports as shown by cess paid.
3. Dealers' stocks in the Federated Malay States are reduced to dry weights by the following fixed ratios: unsmoked sheet, 15% wet sheet, 25% scrap, lump, etc., 40%; stocks elsewhere are in dry weights as reported by the dealers themselves.
4. Columns (33) and (34) represent exports of rubber subject to regulation which, for Singapore and Penang Islands are represented by sales or exports as shown by cess paid.
5. All statements are brought up to date monthly, and any inaccuracies that may be disclosed are corrected in the totals; the latest publication therefore, is always the most reliable.
6. The above, with certain omissions, is the Report published by the Registrar-General of Statistics, S.S and F.M.S., at Singapore on 24th November, 1939

METEOROLOGICAL SUMMARY, MALAYA, OCTOBER, 1939.

Locality.	Air Temperature in degrees Fahrenheit							Earth Temperature		Rainfall								Bright Sunshine.		
	Means of			Absolute Extremes						Total.		Most in a day.	Number of days.					Total.	Daily Mean.	Per cent.
	A. Max.	B. Min.	Mean of A and B	Highest Max.	Lowest Min.	Lowest Max.	Highest Min.	At 1 foot	At 4 feet			Amt.	Precipitation .01 in or more	Precipitation, .04 in or more	Thunder-storm	Fog morning obs.	Gale force 8 or more			
	°F	°F	°F	°F	°F	°F	°F	°F	°F	in.	mm.	in.						hrs.	hrs.	
Railway Hill, Kuala Lumpur, Selangor ...	88.1	72.2	80.1	92	69	83	75	83.0	83.9	9.44	239.8	1.28	22	18	6	5	—	129.55	4.18	35
Bukit Jeram, Selangor† ...	87.5	72.6	80.1	92	69	82	76	84.1	85.3	7.68	195.1	2.48	18	13	1	1	—	150.70	4.86	40
Port Swettenham, Selangor	87.1	73.0	80.1	91	70	78	75	83.5	84.5	8.72	221.5	1.94	21	21	2	—	—	165.10	5.33	44
Sitiawan, Perak ...	88.3	72.5	80.4	91	70	81	75	82.5	83.5	7.82	198.6	1.79	22	20	3	—	1	161.05	5.19	43
Ipoh Aerodrome, Perak ...	88.2	72.4	80.3	93	69	85	75	84.6	86.2	8.00	203.2	2.11	21	19	—	7	—	157.15	5.07	42
Temerloh, Pahang ...	88.2	71.3	79.7	91	69	85	73	82.0	84.0	16.90	429.3	2.81	23	23	6	29	2	147.85	4.77	40
Kuala Lipis, Pahang ...	85.9	73.3	79.6	88	71	81	76	83.5	85.9	13.99	355.3	3.98	19	17	2	—	1	170.25	5.49	45
Kuala Pahang, Pahang ...	85.0	75.1	80.1	88	72	80	79	82.3	83.3	10.80	274.3	1.92	23	18	5	—	1	139.95	4.51	37
Kallang Aerodrome, S'pore ...	84.8	73.7	79.3	88	70	75	77	82.4	83.8	21.58	548.1	4.56	24	20	3	—	—	144.25	4.65	39
Bayan Lepas Aerodrome Penang ...	83.9	73.7	78.8	86	72	79	77	82.0	83.9	18.76	476.5	4.33	20	18	5	1	2	159.70	5.15	43
Malacca Town, Malacca ...	86.8	71.2	79.0	91	69	80	73	81.4	82.2	8.24	209.3	2.00	21	18	8	8	—	119.35	3.85	32
Kluang, Johore ...	86.4	72.0	79.2	90	70	80	75	82.1	82.6	13.03	331.0	2.85	20	17	3	—	1	139.35	4.49	37
Mersing, Johore ...	85.9	73.5	79.7	91	71	76	76	83.9	84.9	11.94	303.3	2.76	28	24	2	1	1	168.50	5.43	45
Alor Star, Kedah ...	87.6	73.0	80.3	90	71	82	75	84.3	85.1	5.27	133.9	0.87	19	15	1	1	—	190.15	6.13	51
Kota Bahru, Kelantan ...	87.0	72.5	79.7	89	70	81	74	82.6	84.8	12.84	326.1	2.33	24	20	13	—	2	202.05	6.52	54
Kuala Trengganu, Trengganu	85.8	75.8	80.8	88	73	82	79	83.0	84.9	18.62	472.9	2.83	22	17	2	—	—	216.60	6.99	58
Labuan ...																				
HILL STATIONS.																				
Fraser's Hill, Pahang 4268 ft.	73.7	62.1	67.9	77	59	70	64	72.1	72.3	10.06	255.5	1.91	25	22	3	11	—	122.55	3.95	33
Cameron Highlands, Tanah Rata, Pahang 4750 ft. ...	71.8	57.7	64.7	75	55	68	62	70.4	70.1	13.59	345.2	2.33	30	26	1	3	2	109.80	3.54	29
Cameron Highlands, Rhododendron Hill, Pahang 5120 ft. ...	71.3	59.0	65.1	75	57	66	61	*	*	13.73	348.7	2.12	29	22	—	—	2	111.25	3.59	30

* Not recorded.